JULY 1990

FINAL ENVIRONMENTAL IMPACT STATEMENT

Clackamas, Douglas, Jefferson, Lane,
Linn, and Marion Counties, Oregon

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ABSTRACT

This Final Environmental Impact Statement (FEIS) describes the seven alternatives for the Land and Resource Management Plan for the Willamette National Forest. The total area of the Willamette National Forest is 1,675,408 acres.

This FEIS has been prepared following public review periods for the Draft Environmental Impact Statement (DEIS) and Proposed Land and Resource Management Plan, during which 177,701 comments were received and considered. The seven alternatives of the FEIS acknowledge the substantive public and other agency comments received. Each alternative responds differently to identified major issues and concerns. The alternatives are: (NC) Continuation of management under the 1977 Land and Timber Management Plan; (A) continuation of management under the 1977 Plan modified to meet Management Requirements (National Forest Management Act of 1976); (D) an emphasis on nonmarket resource values, particularly wildlife habitat, with a moderate emphasis on commodity production; (J) a moderate emphasis on nonmarket resource values with an emphasis to maintain commodity production near historic levels; (K) a high emphasis on commodity production with a low emphasis on most nonmarket resource values (high emphasis on developed recreation); (L) a high emphasis on nonmarket resource values reflected by preservation of many areas in a natural condition and a low emphasis on commodity production; (W) a moderate emphasis on both nonmarket resource values and commodity production, with a slightly greater emphasis on nonmarket values such as water quality, diversity of plant and animal species and old growth. Alternative W is the Forest Service Preferred Alternative.

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INTRODUCTION

The Final Environmental Impact Statement (FEIS) defines and analyzes alternative strategies for management of the Willamette National Forest, one of which has been selected and developed into the accompanying Final Land and Resource Management Plan (Forest Plan).

This is a general summary of the information and analysis contained in the FEIS. It emphasizes the issues and concerns raised by the public and local, state, and Federal agencies regarding the management of the Forest. It briefly describes the purpose and need for the FEIS, the major issues, the seven alternatives, and the environmental consequences of implementation of each of the alternatives. Detailed information and analysis of each of these topics is in the FEIS and its appendices. A thorough reading of the complete FEIS will aid in understanding the Proposed Action which forms the basis for the Final Forest Plan.

This FEIS presents in detail seven different alternatives for managing the lands and resources of the Forest. These alternatives explore varieties of ways of responding to issues identified during the planning process. Each alternative represents a unique combination of land allocations, management prescriptions, activity scheduling, and results in different mixes of goods and services, land uses, and environmental effects.

Federal planning regulations require an analytical process which includes an evaluation of various minimum and maximum resource and economic production levels. In addition, a wide range and relatively even distribution of alternatives must be developed to respond to issues and to reflect national goals such as the Resources Planning Act (RPA) program.

In some alternatives the Forest would be managed to emphasize the production of commodities with a market price. Other alternatives would emphasize resources that do not have a market price, such as dispersed recreation, wildlife, and scenery. One alternative, the No Change Alternative, reflects current management direction projected into the future. Another alternative, the No Action Alternative, reflects current management direction projected into the future including NFMA requirements. Two alternatives were developed in response to requests from public interest groups. One alternative was developed in response to public comments on the DEIS.

The basis for developing alternatives is outlined in the implementing regulations of the National Environmental Policy Act (NEPA) and the National Forest Management Act (NFMA).

AFFECTED ENVIRONMENT

The Willamette National Forest is an administrative unit of the Pacific Northwest Region of the Forest Service, U.S. Department of Agriculture, and is located within the Second, Fourth, and Fifth United States Congressional Districts. It lies primarily in Lane, Linn, and Marion Counties, but also extends south into Douglas County, east into Jefferson County, and north into Clackamas County. The Forest

headquarters is the Supervisor's Office located in Eugene, Oregon. There are seven Ranger Districts, with offices in Oakridge, Westfir, Lowell, Blue River, McKenzie Bridge, Sweet Home, and Detroit (Figure S-1), Vicinity Map).

The Forest stretches for 110 miles along the western slopes of Oregon's Cascade Mountains. The western edge of the Forest borders the Willamette Valley from east of Salem to the Calapooya Mountains northeast of Roseburg. The crest of the Cascade Range defines the eastern boundary of the Forest.

There are over 1.7 million acres within the Forest boundary--1,675,408 acres of National Forest land and 123,330 acres of land in private ownership or managed by other public agencies. Over 380,000 acres of land within the Forest have been designated by Congress as Wilderness.

The physical and social environments that comprise the Forest are determined by a number of distinctive components: geology, climate, soil, water, air, vegetation, fire, fish and wildlife, insects and disease, cultural resources, recreation opportunities and areas, scenery, wild and scenic rivers, wilderness, roadless areas, special interest areas, range, roaded areas, facilities, timber, minerals and energy, and the social and economic environment.

Knowledge of the characteristics of the Forest provides an understanding of the land's capabilities and limitations for sustaining various resources and for predicting subsequent effects of management activities.

Physical Environment

The Oregon Cascade Range of the Forest is divided into two major geologic provinces: the Western Cascades Province and the High Cascades Province. These provinces are influenced by the Pacific Maritime climate which is typified by wet, cool winters and mild warm summers. Composition and origin of Forest soils, along with climate and geology, are fundamental components of the environment. Generally, Forest soils are volcanic in origin and composed of basalts, andesites, and intrusions of various kinds. Water, another fundamental component, draining from Forest lands is generally of high quality and provides for municipal and domestic uses, fish hatcheries, electricity, recreation, fish and wildlife habitat, and supports the vegetative environment.

There are a number of plant communities on the Forest including coniferous forests primarily of Douglas fir, grand fir, western hemlock, and Pacific silver fir; meadows; and subalpine and alpine parklands and wetlands. Fire regimes have played a key role in the development of these plant communities through time. Factors such as fire frequency, duration, intensity, and size all have had a bearing on Forest ecosystems. Fish and wildlife are abundant on the Forest and adapted to a variety of habitats. Of the 30 species of fish on the Forest, most are native to the natural streams and lakes of the western slope of the Cascades. The diversity of habitats supports over 260 wildlife species including 170 avian breeding species, 64 mammalian species, and 30 amphibian and retilian species.

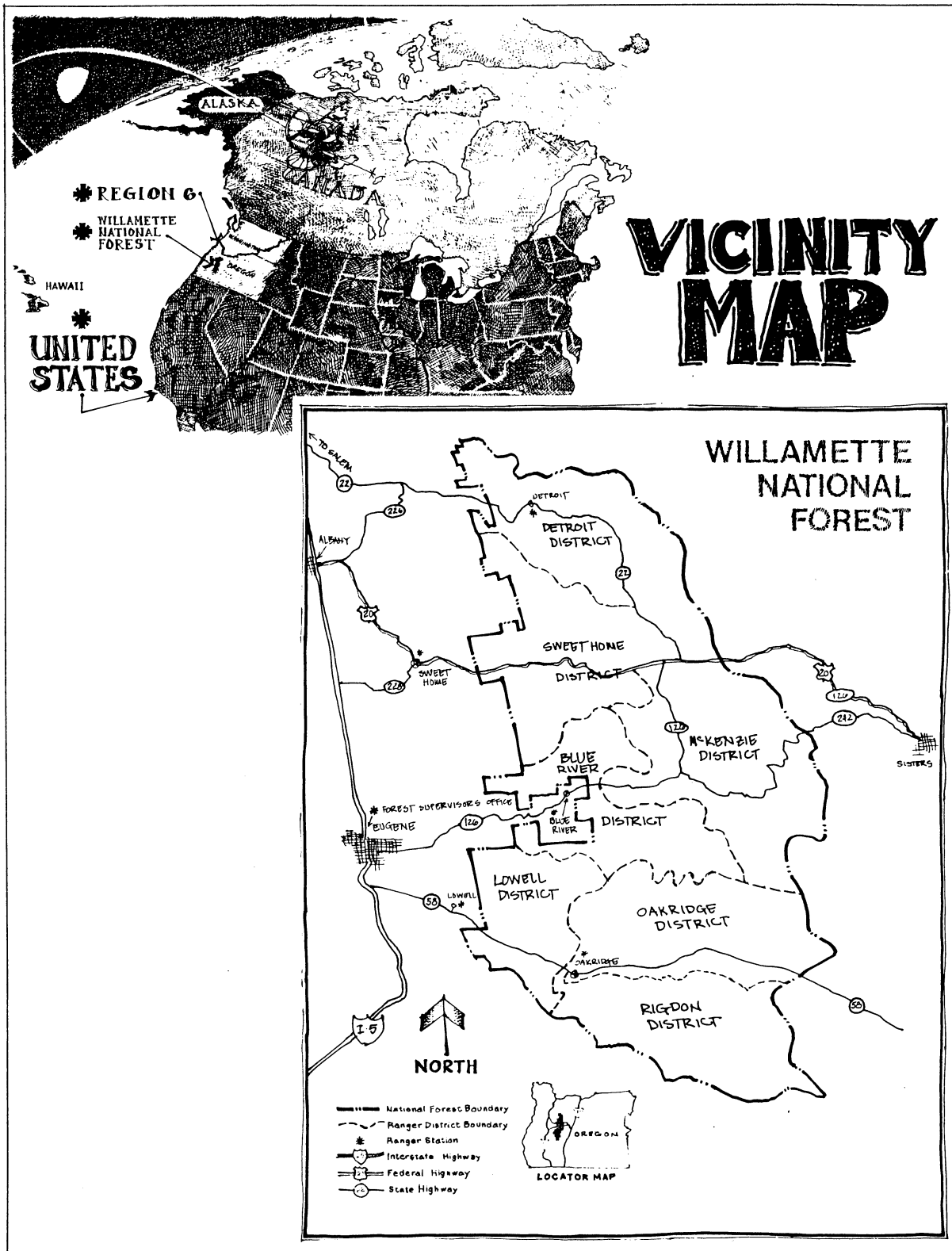
Environments retained in a natural or wild state are represented by wilderness lands and some Forest rivers. There are eight designated Wildernesses on the Forest along with several river segments that are characterized by outstandingly remarkable values and remain free-flowing.

Social Environment

The Forest offers a diversity of social settings as well as natural environments. In addition, within the Forest boundaries is evidence of past and current human use. Human use of lands and resources in

and around the Forest extends over approximately 8000 years. More recent populations utilize Forest lands in ways distinct from the prehistoric populations. Today, Forest users can choose from a wide spectrum of recreation opportunities ranging from primitive to roaded modified settings to developed ski areas or visit and enjoy special interest areas, old-growth groves, and National natural landmarks.

Many local communities rely on the employment and income generated from the use of Forest resources. A measure of stability is derived from a continuous supply of timber being available for harvest from the Forest even though supply is not the only determinant of stable markets. Income and employment are also derived from people traveling through communities on their way to Forest lands for recreation. An awareness of tourism's importance as a source of future economic and social activity for communities in and adjacent to the Willamette Valley is growing.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PURPOSE AND NEED

National Forest System Land and Resource Management Planning is a process for developing, adopting, and revising land and resource management plans for the National Forest System as required by the Forest and Rangeland Renewable Resources Planning Act of 1974 and as amended by the National Forest Management Act (NFMA) of 1976. The resulting Land and Resource Management Plans (Forest Plans) provide for multiple use and sustained yield of goods and services from the National Forest System in a way that maximizes long-term net public benefits while responding effectively to public issues in an environmentally sound manner. The National Forest System Land and Resource Management Planning process is described in Title 36, Part 219 of the Code of Federal Regulations.

This Final Environmental Impact Statement (FEIS) document discloses the analysis and the significant environmental effects of seven alternatives including a proposed action, for the future management of land and resources of the Forest. The purpose of the FEIS is to provide decisionmakers with an environmental disclosure sufficiently detailed to aid in the selection of a Forest Plan which delineates new management direction for the Forest. Equally important, its purpose is to make information available to the public and to encourage public participation regarding implementation and refinement of that direction.

The Preferred Alternative is the "proposed action" (40 CFR 1502.14) for this FEIS and is the basis for the "Willamette National Forest Land and Resource Management Plan" document (Forest Plan). The alternatives presented in this FEIS contain management direction for the next 10 to 15 years. The Forest Service is required to revise the plan within 15 years of its adoption; revision may establish different long-term goals with different projected effects and outputs. The Plan may also be revised or amended, if needed, prior to the scheduled revision date.

The preparation of an Environmental Impact Statement is required because the Forest Plan is a major Federal action which may have a significant effect on the quality of the human environment. Its development follows the direction of the National Environmental Policy Act of 1969 (NEPA) and the Council on Environmental Quality NEPA Regulations (40 CFR 1500-1508). For purposes of disclosure under NEPA, the FEIS and the accompanying Forest Plan are treated as combined documents.

PUBLIC ISSUES

By the time of publication of the DEIS, modifications were made to the 1981 list of primary issues resulting in a revised list that included dispersed recreation; developed recreation; wilderness; cultural resources; livestock grazing; logging residue; air quality; minerals; energy; individual well-being; local economies; economic efficiency;old-growth; roadless lands; scenic quality; timber supply; water quality and quantity; wildlife, fish and plant habitat. These modifications were made to reflect refinements in public opinion during that interval and to reduce complexity within the planning documents. In some cases, interrelated issues were grouped together. Other topics, such as old-growth and roadless lands, had vastly increased in public interest.

While all of the issues were considered during development of the DEIS alternatives, the degree of response to the major ones was of greatest importance in selecting the Preferred Alternative for the Draft Forest Plan. Issues were considered of major importance if they were the subject of continually recurring correspondence, individual visits, or meetings involving other public agencies, organized groups and industry, or the public at large. These issues were also often discussed in media reports. The major issues that provided the focus for the DEIS were Dispersed Recreation; Old Growth; Roadless Lands; Scenic Quality; Timber Supply; Water; and Wildlife, Fish, and Plant Habitat.

The following is a brief discussion of the seven major issues which were the subject of special focus in the DEIS. These issues with some refinements remain the major issues considered in the FEIS and Final Forest Plan.

Dispersed Recreation

Demand for recreation opportunities on the Forest remains high. People are interested in maintaining a wide variety of options for recreation activities. The subject of roaded and unroaded dispersed recreation opportunities carry the greatest potential to vary among Alternatives. There is concern about how the management decisions made in the Forest Plan will increase or decrease these opportunities.

There is continuing, although somewhat less intense, interest in managing for developed recreation, as well. Developed sites are tracked through the process; but they are not treated as a major issues, because there is less land involved and less intensity of public interest. Decisions made regarding developed recreation have a low significance in affecting the overall management of other Forest resources.

Old Growth

In the early stages of development of this Forest Plan, the management of old-growth stands was considered part of the timber production and fish and wildlife habitat issues. By the publication of the DEIS, however, increasing public attention had warranted treating it as a separate category despite its particularly strong interrelationships with other issues.

Part of the public sees a need to preserve old growth for its benefits to plant and wildlife habitat diversity, soil and water productivity, and its recreational and aesthetic values. Another segment of the public recommends utilizing old growth for its high value timber products, at the same time converting the old growth stands to more vigorously growing second growth stands to support future timber production needs.

Roadless Lands

Although the Oregon Wilderness Act of 1984 resolved part of the issue concerning Wilderness, interest in some of the Forest's roadless lands has remained high. "Wilderness" as an issue was rated highly important by the 1981 respondents. In 1983 a reinventory of the roadless lands on the Forest included extensive public involvement, including a 1200-piece mailing and a series of public meetings. The 1984 Act increased the amount of designated Wilderness on the Forest to about 25% of the total land base.

The nature of the roadless lands issue revolves around using these lands for timber production; or deferring harvest to preserve old growth trees, provide habitat diversity, provide dispersed recreation opportunities, and protect aesthetic values. A no-harvest allocation assigned to unroaded areas would also maintain options for future designation as Wilderness. Some people feel that the marketable resources in these areas should be developed; some feel that they should remain undeveloped. Still others feel that some lands currently in a developed condition should be returned to an undeveloped condition, particularly if the lands are adjacent to designated Wilderness.

Scenic Quality

The visual quality of the Forest landscape is of concern to adjacent landowners, travelers, and Forest visitors. Many people prefer not to see evidence of timber harvesting from major highways and popular

recreation areas such as trails, campgrounds, and scenic overlooks. Other people, who tend to favor utilization of Forest resources, feel that most visual effects of resource management activities are temporary, so that Visual Quality Objectives should play a reduced role in planning such activities.

Timber Supply (Current and Future Timber Production)

The Forest annually provides the largest amount of timber production in the National Forest System. The amount of timber produced on the Forest therefore assumes some level of national as well as local importance. In addition, since the wood products industry is one of the three major components of the economy of the State of Oregon, concern has also been high for several years about the level of contribution the Forest's timber resource makes to the overall timber supply within the State, as well. In the 1981 survey current and future timber production received the highest weighted importance. Interest has remained high since then.

Some people feel that the allowable harvest is too high, resulting in unacceptable adverse effects to other resource values. Others believe that the level of harvest should be maintained or increased to provide the raw material to help satisfy demand for wood products and to provide a stabilizing force on the economies of local communities which may be highly dependent upon the various wood products industries.

Additional components of the timber supply issue include: logging residues and firewood, harvest schedules and methods, use of herbicides and fertilizer, reforestation, species mix, and access.

Water Quality and Quantity

Water quality received the second highest rating for issue importance in the 1981 issue development survey. The natural level of water quality on the Forest is generally quite high. Consequently, unlike many of the other issues addressed by the Forest Plan, the concern centers more on minimizing degradation than taking specific actions to enhance the resource over natural levels. Accordingly, much of the treatment given this issue can be found in the Standards and Guidelines and Monitoring sections of the documents.

Water quantity was of less concern than quality. Adequate and consistent water supply for streamflow for fish habitat and domestic uses was of greatest concern.

Wildlife, Fish, and Plant Habitat

The broad issue of habitat represents a complex of concerns about the living components of the Forest. Central to the issue are matters of species survival and maintaining ecological diversity.

Concerns range from continuation of game species for hunting and fishing to preservation of reptiles and insects to threatened, endangered, and sensitive plant species. Differences of opinion arise about the extent and nature of land allocations and mitigation requirements associated with various individual, commercial, and management activities which are needed to assure adequate support for the viability and distribution of the various native species.

Issue Refinement Between the DEIS and the FEIS

The key issues did not change between the DEIS and the FEIS, but some refinements in focus occurred, most notably to five of the key issues. Responsiveness to these refinements ultimately led to analysis of three new alternatives in the FEIS.

Dispersed Recreation

A segment of the McKenzie River and the North Fork of the Middle Fork of the Willamette River received Wild and Scenic River designation by Congress in 1988. Congress also required that Blue River and the South Fork of the McKenzie River be studied for their suitability for Wild and Scenic River status. The State of Oregon added two additional rivers to its State Scenic Waterways inventory. Interest in studying additional rivers and their segments for similar designations has intensified.

Special designations of these types affect management practices on the rivers and surrounding lands. Timber harvest, road building, and recreation site development may be constrained or eliminated for some distance from the rivers themselves. Retaining the special values of study rivers pending suitability determination similarly affects the nature and extent of new management activities in those areas until suitability is resolved.

Old Growth

The intensification of public interest surrounding old growth has involved a number of key issues: old growth as forest structure; old growth as a reservoir of timber supply; old growth as an ecosystem providing a unique habitat in support of other plant and animal species.

One of the more perplexing aspects to addressing old growth concerns was the apparent lack of unanimity of definition. Definitions have been proposed by various groups, including USFS - Region 6 (Regional Guide), the Pacific Northwest Range and Experiment Station (PNW 447), the Wilderness Society, and the Society of American Foresters. Data is analyzed and displayed in the FEIS using the USFS Region 6 definition.

Increased attention has focused on the silvicultural values of old growth structure, including its capability to retain and enhance soil and water productivity. This attention has not limited its scope to preservation of existing stands. Indeed, interest in old growth structure has been instrumental in the development of changing philosophies of site utilization and stand regeneration techniques, known as "New Forestry" and "New Perspectives in Forestry."

Differences in public and professional opinion exist about the extent to which increased preservation of old growth and "New Perspectives" forestry should occur; the specific nature of indicated practices; the best locations in which to undertake the practices; and the attendant risks involved, such as susceptibility to fire and disease.

Timber Supply

The timber supply issue intensified to near-crisis proportions during the period between the DEIS and the FEIS. Although the values of harvested timber on the Forest reached all-time highs, the volume sold for eventual harvest dramatically decreased by fiscal year 1989. Much of the reduction in sold volume was in response to court injunctions associated with spotted owl habitat litigation. The current and intermediate term availability of timber from all sources within the State of Oregon achieved

high levels of public concern. Central to this concern was the contribution made by the Federal sector, particularly in the form of old growth timber.

Ultimately, Congress balanced the habitat needs of the spotted owl with the Federal supply needs of old growth dependent mills by passing the Northwest Timber Compromise as Section 318 of the Fiscal Year 1990 Appropriations Act. This legislation was acknowledged not to represent a permanent solution, however. Consequently, the public issues remain for evaluation under the planning process.

In addition, many public comments alerted the Forest to improvements which could be made to the technical analysis of timber availability.

Water Quality and Quantity

Public comments during the response period after publication of the DEIS sent a strong message that many of the alternatives in the DEIS, including the preferred alternative, proposed unacceptable levels of watershed degradation. This did not so much represent a refinement of public concern as it represented a reaffirmation of the intensity with which the concern was held and the need for the Forest to address the issue with greater sensitivity.

Wildlife, Fish, and Plant Habitat

During the interval between the DEIS and FEIS, concerns surrounding plant and animal diversity and habitat preservation intensified. These concerns spanned a wide variety of species, habitats, and management practices. The most notable representatives of these concerns were spotted owl habitat, old growth as a reservoir of a unique and valuable ecosystem, and riparian areas as critical ecosystems.

These issues were central to examining notions such as habitat connectivity and preserving options. In many cases, however, decisions to provide or enhance such connectivity or to preserve options produce reductions in timber supply or suggest relatively more costly harvest techniques.

DEVELOPMENT OF ALTERNATIVES

The following section describes how resource issues were identified and developed into a range of alternative land allocations and management direction responsive to the National Forest Management Act, National Environmental Protection Act, and the public.

Information on the amount and location of resources has been compiled through inventories of timber conditions, recreation use, wildlife populations, soil and water resources, and roads. These inventories were combined in the Geographical Mapping System (GMS) for use in the development and analysis of alternatives. This information was collected on a common map base, with different map layers developed for the various resources and inventory components. This data base was updated between the DEIS and FEIS to reflect changes in land suitability, timber harvest and growth, and a revision of the spotted owl, pileated woodpecker, and pine marten habitat networks.

The alternative formulation process began in November 1984 with a review of Forest issues, concerns, opportunities and resource inventories; resource production capabilities identified in the analysis of the management situation; and applicable planning direction. Based on a review of these items resource management options were developed for nine resource areas: Recreation; Fish and Wildlife; Timber; Range; Soil, Water, and Air; Minerals and Energy; Lands; Facilities; and Protection. Each option was comprised of management direction statements for the important factors for that resource. The resource management options were designed to incorporate issues, reflect a particular level of management emphasis, and serve as a potential building block for Forest management alternatives.

The draft resource management options were reviewed by the public during 1985, with the knowledge that these options would be used as building blocks for alternatives. Public response was evaluated and the resource options were modified to reflect public comments. The resulting options were utilized in the development of preliminary alternatives.

A review of the options for the nine resource areas indicated that some resources relate primarily to the allocation of land and scheduling of timber harvests for achievement of their objectives (Timber, Recreation, and Fish and Wildlife), while other resources are primarily dependent on program budget and/or administrative action (Facilities).

From the combinations of resource option descriptions nine preliminary alternative descriptions were written and rough estimates of some outputs were made. Two preliminary alternatives were dropped due to significant overlap and duplication. Subsequently, seven alternatives were examined as to how well they resolved Forest issues.

Two alternatives required by NFMA regulations, No Action and one demonstrating ability to meet the goals of the Resource Planning Act (RPA), were added to the list for consideration at this time. Two additional variations on preliminary alternatives were developed which allowed for departure from long-term sustained yield. Due to significant overlap and duplication, three preliminary alternatives were dropped leaving eight alternatives in the DEIS. In June of 1987 a ninth alternative was included in the array of alternatives in response to decisions made regarding an appeal brought by the Northwest Forest Resources Council. In the DEIS, the ninth alternative is referred to as the "No Change" (NC) alternative and is based on the potential yield of the Forest's 1977 Timber Management Plan.

During the review period for the DEIS, many comments were received indicating how well the public felt the key issues were addressed by the alternatives. A large number of the commentors expressed the opinion that not all reasonable and viable means of addressing the issues were considered (or at

least considered in sufficient detail) in the DEIS. With public comments for direction, the Forest IDT and management team revisited the alternative formulation process used in the development of the DEIS. The resource options, the management prescriptions and the acre allocations were reviewed and revised. The result of the revisions were three additional alternatives in the FEIS that were not considered in the DEIS.

CHANGES BETWEEN THE DRAFT ENVIRONMENTAL IMPACT STATEMENT AND THE FINAL ENVIRONMENTAL IMPACT STATEMENT.

The DEIS and Proposed Forest Plan documents were available for public review from January to May 1988. The public review process and comments received during this period are described in the FEIS Chapter I, Appendix A, and Appendix I. After the public comment period had closed and the comments had been reviewed, the Forest interdisciplinary team (IDT) explored ways to respond to public concerns.

Many of the comments suggested that:

- Alternatives be modified;
- Alternatives be developed or evaluated that were not given adequate consideration in the DEIS;
- Analyses presented in the DEIS be supplemented, modified, or improved;
- Factual corrections be made in information or data used in the analyses.

After reviewing these comments, the IDT and Forest management team agreed on changes that should be made in the FEIS. In some cases, the changes involved analysis methods and data common to all of the alternatives. Other changes involved considering alternatives not analyzed in the DEIS while dropping others that had been analyzed. The new alternatives were developed based on public response to specific issues and the proposed resolution of these issues displayed in the DEIS. The new alternatives propose different land allocations, management prescriptions, and standards and guidelines from the set of alternatives analyzed in the DEIS as means of resolving those issues.

The IDT updated or reanalyzed all of the alternatives considered in the FEIS. As a result, a new Preferred Alternative was identified: Alternative W. The Forest Plan was revised to reflect the proposed changes between Alternative J, the Preferred Alternative in the DEIS, and Alternative W. The Plan and the FEIS were submitted to the Regional Forester for review.

Following is a summary of revisions made between the DEIS and FEIS to respond to concerns raised during the public comment period.

- Alternatives B and J-Departure were dropped from the set of alternatives considered in detail. Both proposed a timber sale schedule that departed from long-term sustained yield capacity. Public responses were largely indifferent to the departure alternatives as a means of addressing the timber supply issue. Concerns were raised, however, about the environmental effects associated with the departure alternatives. Environmental effects of the departure alternatives were generally the most adverse of the range of alternatives considered in the DEIS (see Chapter IV, DEIS).

- Alternatives C and I were also dropped as alternatives considered in detail in the FEIS. While there was a moderate amount of favorable public comments on both of these alternatives, other alternatives were proposed and considered in the FEIS that address similar goals and objectives.

- Alternative K was added in response to public comments. Many individuals, as well as timber industry organizations, expressed a desire for an alternative that would maintain the timber harvest near the level in the current plan (1977). Although similar to Alternative I in the DEIS in some respects, differences in specific resource goals and objectives led to developing Alternative K. The Willamette Forestry Council (WFC) played a major role in advising on the development of Alternative K.

- Alternative L was also added in response to public comments that noncommodity uses of the Forest were not adequately represented in the alternatives in the DEIS. Many people were concerned that an alternative proposed by the Oregon Natural Resources Council (ONRC) for the DEIS was not fully analyzed. Alternative L was developed with suggestions from ONRC and affiliated groups.

- Alternative W (Preferred Alternative) was added to the set of alternatives largely in response to comments on Alternative J, the PA in the DEIS. Although the initial thought was to modify Alterative J in response to the criticism, it became apparent that the significance of the changes in specific resource practices as well as overall goals and objectives were as great as the differences between some of the alternatives considered in the DEIS. A new alternative was developed to help clarify the differences.

ALTERNATIVES, INCLUDING THE PROPOSED ACTION

Seven alternatives are considered in detail in the FEIS: Alternatives NC, A, D, J, L, K, and W. These offer differing approaches as to how land and resources of the Forest could be managed. Each contain a set of land allocations, management practices, and activity shedules which, when implemented, would result in a unique combination of resource outputs and environmental consequences. Together, they present a broad range of possible management alternatives.

ALTERNATIVE NC (No Change)

The No Change (NC) Alternative represents implementation of the Forest's existing Land Management and Timber Management Plan to achieve timber production at potential yield levels.

The No Change Alternative has been developed in response to decisions made regarding Appeal Number 1588, brought by the Northwest Forest Resources Council on May 19, 1986. The appeal centered on a decision by Regional Forester James F. Torrence to "require inclusion of Minimum Management Requirements (MMRs) in the No Action Alternative for each Forest Plan." The substance of the appeal was that a "true No Action Alternative representing current management plans" was not included in the DEIS and is not included in the FEIS. In response to this, a No Change Alternative has been developed to represent the existing timber management plan, and consequently does not comply with all provisions of the National Forest Management Act (NFMA) and regulations promulgated by the Secretary of Agriculture to implement NFMA.

ALTERNATIVE K

Alternative K represents a low emphasis on nonmarket values and a high emphasis on commodity production. The management philosophy of this alternative is one which emphasizes a public understanding of the practices which are undertaken to maximize production of market goods from the forest, under multiple-use principles. The focus is to maintain high levels of timber harvest by making most of the Forest's tentatively suited land available for timber production. The objective is to maintain a timber supply level equal to the historical levels. This Alternative was formulated with input from the Willamette Forestry Council (WFC).

Roadless areas not designated as Wilderness in the 1984 Oregon Wilderness Act would be managed for a variety of multiple use values including timber, except for Bull of the Woods Roadless Area. The visual quality objective would be to allow all types of management activities to be seen in all areas, but the activities would not dominate the views.

Developed recreation would be emphasized with all existing and inventoried potential developed recreation sites being managed and protected. The Forest transportation system would increase, making larger areas accessible for motorized recreation.

An objective would be to maintain water quality by insuring strict adherence to operational Best Management Practices.

ALTERNATIVE A (No Action)

Alternative A represents implementation of the Forest's existing land allocations with the addition of management requirements for wildlife habitat and riparian areas, and updates on inventories of land suitability and timber yield tables. This alternative emphasizes a high level of timber production and a low emphasis on roadless recreation and other non-commodity forest uses.

ALTERNATIVE J

Alternative J represents a moderate emphasis on nonmarket resources and on commodity production. The focus is to balance the need for timber supply at near historical levels while maintaining several important roadless areas, important old-growth areas, and scenic values in a way that provides some degree of issue resolution for each. This was the Preferred Alternative of the DEIS.

ALTERNATIVE D

Alternative D represents a high emphasis on non-market resources with a moderate emphasis on commodity production.

Habitat for management indicator species pileated woodpecker, martens, and spotted owls would exceed levels required for Management Levels. Many areas would be managed for high quality big game habitat, and many unique special wildlife habitat areas would be recognized.

Dispersed Recreation would be emphasized by maintaining several roadless areas in their current condition. The scenic quality from many major highways would remain natural.

Riparian areas would be managed to provide input of near-natural levels of large woody material for fish habitat maintenance and improvement.

ALTERNATIVE L

Alternative L places a high emphasis on nonmarket values, and low emhasis on timber commodity values by preserving areas currently not highly impacted by past management activities in their natural condition and by proposing other areas for natural recovery from the effects of past management. This alternative was formulated with input from the Oregon Natural Resources Council (ONRC).

High levels and quality of recreation opportunities and experiences would be provided. Scenery would be enhanced by managing all areas according to Visual Quality Objectives and by rehabilitating unacceptable modifications.

The full inventory of roadless areas would be maintained in an undeveloped condition with an emphasis on semi-primitive nonmotorized activities. Opportunities for high quality wilderness experiences would be increased by proposing additional areas for Wilderness study and for Wilderness designation.

The quantity, quality, and diversity of plant and animal communities would be maintained at high levels. All management requirements for pileated woodpeckers, martens, and spotted owls would be exceeded and habitat would be provided for the full inventory of verified Spotted Owl pairs. All areas of diverse habitats, geologically significant areas, and "millenium" old-growth groves would be managed

to protect and enhance desirable attributes. Old-growth characteristics would be retained in all managed stands.

Riparian areas would be managed to maintain and enhance riparian dependent species and connective corridors across the landscape.

ALTERNATIVE W (Preferred Alternative)

This alternative is designed to provide a healthy, diverse, and productive ecosystem that would ensure the capability of the Forest to produce a continuous flow of a variety of goods and services to the public over the long-term. Alternative W was formulated to respond to public comments to the DEIS.

The ability to provide a dependable supply of timber to the market would continue. This alternative recognizes the importance of maintaining old-growth characteristics in some managed stands. Where timber production is either reduced below biological potential or removed from scheduled timber production to recognize other resource goals and benefits, this alternative would emphasize the use of these areas to support complementary resource goals such as wildlife, dispersed recreation, watershed protection, biological diversity and ecological studies.

Additional recreation opportunities would include expanding activities compatible with areas withdrawn from timber harvesting as well as providing opportunities such as low elevation hiking trails within areas intensively managed for timber production.

A special emphasis of this alternative would be to recognize the role of river corridors and streamside zones on the Forest as critical components in the ecosystem. Management activities in these areas would focus on maintaining and enhancing the long term productivity, first, for those uses dependent on rivers and streams and secondly, for other resources. Timber scheduling would be responsive to the cumulative effects of watershed conditions.

Table S-1. Resource Outputs, Effects, Activities, and Costs

Output/Effects	Unit	Decade	Alternatives						
			NC [1] (No Change)	K (WFC)	A (No Action)	J (DEIS-PA)	W (PA)	D (Wildlife)	L (ONRC)
Water									
Low Watershed Impact	% Area	1	NA	44	47	65	100	78	100
Moderate Watershed Impact		1	NA	27	25	17	0	10	0
High Watershed Impact		1	NA	29	28	18	0	12	0
Erosion (Debris Slides)	M Cu-Yd	1	NA	85.6	80.3	67.0	34.0	33.4	23.9
Water Yield	M Ac-Ft	1	8,895	8,895	8,895	8,895	8,895	8,895	8,895
		2	8,895	8,895	8,895	8,895	8,895	8,895	8,895
		5	8,895	8,895	8,895	8,895	8,895	8,895	8,895
Lands Tentatively Suitable for Timber Production	M Acres	-	1,136.4	1,032.1	1,032.1	1,032.1	1,032.1	1,032.1	1,032.1
Lands Suitable for Timber Production	M Acres	-	1,064.6	932.8	874.3	853.4	774.6	719.4	553.1
Lands by Timber Yield Levels									
Full Yield (95-100%)	M Acres	-	918.7	797.0	743.4	719.6	689.2	638.9	314.3
75-94% of Full Yield	M Acres	-	54.0	70.3	71.3	72.6	42.9	40.4	74.9
50-74% of Full Yield	M Acres	-	91.9	65.5	59.6	61.2	42.5	40.1	89.0
1-49% of Full Yield	M Acres	-	0	0	0	0	0	0	74.9
Tentatively Scheduled Timber Harvest									
Clearcut [2]	M Acres	1	14.4	12.6	12.1	10.2	9.1	9.9	3.3
		2	NA	12.6	12.1	10.0	9.4	10.0	2.8
		5	NA	11.8	11.6	8.2	8.1	8.5	2.3
Commercial Thin	M Acres	1	4.2	3.1	3.2	2.6	2.8	2.7	0.2
		2	NA	0.2	0.2	1.7	2.1	0.3	0.9
		5	NA	2.8	1.3	10.1	6.8	5.5	4.9
Reforestation	M Acres	1	14.4	12.6	12.1	10.2	9.1	9.9	3.3
		2	NA	12.6	12.1	10.0	9.4	10.0	2.8
		5	NA	11.8	11.6	8.2	8.1	8.5	2.3
Timber Stand Improvement [3]	M Acres	1	12.9	21.3	20.7	20.4	18.1	19.3	8.1
		2	NA	22.8	22.8	18.3	17.7	18.0	5.8
		5	NA	21.7	21.7	16.7	17.8	15.5	5.4
Timber Sale Program Quantity [4]	MMBF	1	1,013	799	748	652	604	586	185
		2	NA	810	760	654	596	597	190
		5	NA	621	555	558	495	438	142

Output/Effects	Unit	Decade	NC [1] (No Change)	K (WFC)	A (No Action)	J (DEIS-PA)	W (PA)	D (Wildlife)	L (ONRC)
Timber Sale Program Quantity [4]	MMCF	1	183	144	135	116	107	105	33
		2	NA	144	135	116	107	106	33
		5	NA	127	117	110	98	92	30
Allowable Sale Quantity [5]	MMBF	1	810	650	608	530	491	476	150
		2	810	658	618	532	484	486	155
		5	810	573	532	481	440	407	129
Allowable Sale Quantity [5]	MMCF	1	146	117	110	95	87	86	27
		2	146	117	110	95	87	86	27
		5	146	117	110	95	87	86	27
Long-Term Sustained Yield	MMCF	-	146.0	120.0	113.5	107.8	94.7	93.8	34.2
Firewood [6]	M Cords	1	71.9	57.0	53.6	46.2	42.4	41.8	13.5
		2	NA	57.0	53.6	46.2	42.4	41.9	13.5
		5	NA	24.2	19.2	33.8	25.0	16.4	6.8
Timber Growth in 5th Decade	MMCF	-	NA	112.1	105.9	102.8	88.9	91.0	33.9
Old Growth at End of Decade[7]	M Acres	1	494.0	522.4	528.4	534.9	533.4	537.2	578.3
		2	NA	449.7	460.9	473.6	479.1	478.4	558.1
		5	259.8	305.1	337.0	341.1	365.2	367.8	523.1
Fuel Treatment	M Acre	1	8.6	7.6	7.3	6.1	5.5	5.9	2.0
		2	NA	7.6	7.3	6.0	5.6	6.0	1.7
		3	NA	7.1	7.0	4.9	4.9	5.1	1.4
Anadromous Smolt Habitat Capability	M Smolt	1	NA	409	410	411	438	433	437
		2	NA	536	536	538	572	567	572
		5	NA	536	536	538	572	567	572
Resident Fish Production Capability	M Legal Size	1	NA	2427	2427	2427	2506	2506	2506
Bald Eagle	Protected Sites[8]	-	21	21	21	24	24	27	27
Spotted Owl Habitat Areas	Areas	-	NA	59	59	59	59	102	184
Pileated Woodpeckers	Areas [9]	-	NA	156	156	156	156	274	355
Marten	Areas [9]	-	NA	256	256	256	256	412	438

Output/Effects	Unit	Decade	NC [1] (No Change)	K (WFC)	A (No Action)	J (DEIS-PA)	W (PA)	D (Wildlife)	L (ONRC)
Primary Cavity Excavators	% Bio. Poten-tial	1	NA	40	38	41	43	44	49
		2	NA	43	43	43	45	46	49
		5	NA	40	41	42	45	45	49
Elk	PTI [10]	1	NA	1.0	1.1	1.2	1.3	1.5	1.5
		2	NA	0.97	1.2	1.3	1.6	2.0	1.9
		5	NA	0.91	1.2	1.2	1.5	2.4	1.9
Deer	PTI [10]	1	NA	1.0	1.1	1.3	1.4	1.6	1.5
		2	NA	0.98	1.2	1.6	1.7	2.1	2.0
		5	NA	0.96	1.2	1.3	1.6	2.5	2.0
Consumptive Wildlife Use	MWFUDs	1	NA	108	117	129	145	157	157
		2	NA	104	125	145	177	217	206
		5	NA	99	125	129	168	263	206
Nonconsumptive Wildlife Use	MWFUDs	1	NA	704	758	841	941	1021	1021
		2	NA	674	811	941	1153	1338	1409
		5	NA	644	811	841	1049	1338	1708
Acres of Unroaded Areas Still Meeting Roadless Definitions at the End of the Decade.	M Acres	1	84.9	104.9	70.8	42.0	52.7	0.8	16.3
		2	45.7	65.7	22.7	23.2	30.6	0.0	12.9
		5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Unroaded Areas Assigned to Unroaded Rx	M Acres	-	45.4	25.3	59.8	79.7	92.1	136.9	145.9
Visual Quality Objectives									
Preservation	M Acres	-	437.9	503.8	547.4	586.4	591.1	647.7	912.8
Retention	M Acres	-	88.6	72.0	77.9	90.5	118.8	142.1	265.1
Partial Retention	M Acres	-	114.3	147.5	150.1	177.7	171.7	245.7	286.3
Modification	M Acres	-	4.5	123.6	4.5	206.2	143.0	108.4	4.5
Maximum Modification	M Acres	-	1,030.1	828.6	895.4	614.6	650.8	531.6	210.6
Trail Construction	Miles	1	0	0	0	4.0	6.0	6.8	4.0
		2	0	0	0	0	0	0	0
		5	0	0	0	0	0	0	0
Trail Reconstruction	Miles	1	68	68	68	70	72	72	70
		2	68	68	68	70	72	72	70
		5	68	68	68	70	72	72	70
Developed Site Construction	PAOT	1	0	390	0	51	327	120	0
		2	0	390	0	20	56	55	0
		5	0	390	0	0	25	0	0

Output/Effects	Unit	Decade	NC [1] (No Change)	K (WFC)	A (No Action)	J (DEIS-PA)	W (PA)	D (Wildlife)	L (ONRC)
Developed Site Reconstruction	PAOT	1	844	844	844	844	844	844	844
		2	844	974	844	861	953	884	844
		5	844	1040	844	868	1014	902	844
Developed Recreation Use [11]	MRVDs	1	2,056	2,056	2,056	2,056	2,056	2,056	2,056
		2	2,539	2,953	2,539	2,799	2,953	2,830	2,539
		5	2,539	4,481	5,539	2,799	3,073	2,830	2,539
Wilderness Recreation Use [11]	MRVDs	1	352	352	352	368	342	207	370
		2	415	415	415	401	342	269	447
		5	436	436	436	412	342	283	460
Nonwilderness Dispersed Recreation Use[11] [12]									
Semiprimitive Nonmotorized Use	MRVDs	1	52	7	50	54	52	70	52
		2	52	7	50	54	52	90	52
		5	52	7	50	54	52	90	52
Semiprimitive Motorized Use	MRVDs	1	50	64	49	64	64	64	64
		2	50	93	49	69	76	80	93
		5	50	111	49	69	76	80	126
Roaded Natural Use	MRVDs	1	1,054	1,278	1,278	1,278	1,278	1,278	1,278
		2	1,054	1,694	1,764	1,880	1,880	1,880	1,880
		5	1,054	1,694	1,764	2,194	2,310	2,853	2,853
Roaded Modified Use	MRVDs	1	376	376	376	376	376	376	376
		2	553	553	553	553	553	553	382
		5	839	839	839	839	839	839	382
Road Construction	Miles	1	82	55	50	45	40	30	12
		2	36	9	13	7	7	5	4
		5	0	4	5	4	2	1	1
Road Reconstruction	Miles	1	236	222	204	178	174	153	81
		2	NA	220	202	176	171	151	79
		5	NA	220	202	176	171	151	79
Roads Suitable For Public Use									
Passenger Car	Miles	1	1,735	1,580	1,610	1,600	1,580	1,580	1,580
		2	NA	1,585	1,660	1,640	1,585	1,585	1,585
		5	NA	1,585	1,670	1,650	1,585	1,585	1,585
High Clearance Vehicles Only	Miles	1	4,600	4,600	4,560	4,530	4,530	4,500	4,200
		2	NA	4,700	4,770	4,700	4,550	4,520	4,220
		5	NA	4,760	4,820	4,740	4,570	4,550	4,230
Closed to Motor Vehicles	Miles	1	1,085	970	930	920	890	820	935
		2	NA	955	800	820	935	845	955
		3	NA	1,105	910	910	1,045	865	985

Output/Effects	Unit	Decade	NC [1] (No Change)	K (WFC)	A (No Action)	J (DEIS-PA)	W (PA)	D (Wildlife)	L (ONRC)
Total Budget (1982 $)	Million $	1	NA	62.6	58.2	52.2	49.2	49.6	26.4
		2	NA	56.1	52.5	47.8	46.2	45.5	25.0
		5	NA	55.7	51.4	49.5	45.2	46.1	26.3
Present Net Value (15 Decade Total)	Million $	-	NA	3,503	3,184	3,060	2,858	2,780	1,607
Returns to Government	Million $	1	166.2	128.6	119.9	106.1	101.2	91.8	32.4
		2	NA	151.6	141.5	122.6	108.0	109.9	40.3
		5	NA	143.7	130.2	135.6	117.6	97.8	32.5
Payments to Counties	Million $	1	41.6	32.2	30.0	26.5	25.3	23.0	8.1
		2	NA	37.9	35.4	30.6	27.0	27.5	10.1
		5	NA	35.9	32.6	33.9	29.4	24.4	8.1
Change in Jobs (Relative to Historic level = 13,257)	Number	1	5,653	2,945	2,219	900	204	-167	-5,499
Change in Jobs (Relative to Alternative NC = 16,303)	Number	1	--	-2,078	-3,434	-4,753	-5,449	-5,820	-11,152
Change in Income (1982 $) (Historic Level = 340.4)	Million $	1	155.7	73.9	52.7	14.3	-5.6	-15.1	-172.8

Footnotes for Table II-21.

[1] NA = Data Not Available; could not be reasonably estimated, or compared to other Alternatives, since Alternative NC (No Change) is based on a significantly different set of assumptions than the other Alternatives, and could not be modeled with the current Willamette National Forest FORPLAN model. Section D4b, of Chapter II in the DEIS describes these differences.

[2] Approximately 7% of these acres would be shelterwood harvests

[3] TSI includes release from competing vegetation, precommercial thinning, and fertilization.

[4] Includes net green volume plus salvage, cull, unregulated, and miscellaneous convertible products. The average annual amount of timber sold 1977-1986 was 784 MMBF, and the amount harvested was 607 MMBF.

[5] Includes only live, sound wood.

[6] Historically the firewood supply has come from a portion of the cull material, and is included in the Timber Sale Program Quantity above.

[7] Old growth based on the Pacific Northwest Regional Guide definition.

[8] Includes both existing and potential habitat areas.

[9] Areas include contributing habitat from SOHAs and/or pileated woodpecker habitat.

[10] Population Trend Index; Population trend values by decade are compared to a current level of 1.00.

[11] Recreation visitor day use for the No Change Alternative was developed from previous inventories and yield tables and does not incorporate the latest methods of calculating RVD outputs.

[12] RVD outputs for the No Change Alternative are available for total dispersed use.

MRVDs = Thousands of Recreation Visitor Days
PAOT = Persons at One Time
M Acres = Thousand Acres
MWFUDs = Thousand of Wildlife and Fish User Days
M Smolt = Thousand Smolt (Young Anadromous Fish)
PTI = Population Trend Index%/bio-pot = Percent of Bio-potential
AUMs = Animal Unit Months
MMBF = Million Board Feet
MMCF = Million Cubic Feet
M Ac-Ft = Thousand Acre-Feet
Cu. Yds/Yr = Cubic Yards per Year
Additional information about these terms is included in the Glossary

MANAGEMENT AREAS

Management areas are portions of the Forest to which a specific set of management practices are applied and for which standards and guidelines have been developed. Although a specific use or resource may be featured or emphasized in each description, other uses and resources are provided for in the standards and guidelines established for each management area. The alternative maps in the accompanying map packet display the actual management area allocations for each alternative. The management area allocations associated with each alternative are shown in Table S-2.

Table S-2. Management Area Acreage of Alternatives

	Alternatives						
Management Areas	**NC**	**K**	**A**	**J**	**W**	**D**	**L**
1 Wilderness	380,805 [1]						
Management Area 1a	NA	14,482	14,482	3,305	2,111	--	2,316
Management Area 1b	NA	25,958	25,958	36,730	34,958	14,482	81,770
Management Area 1c	NA	41,018	41,018	41,423	43,963	66,976	54,845
Management Area 1d	NA	299,347	299,347	299,347	299,773	299,347	411,234[6]
2 Oregon Cascades Recreation Area							
Management Area 2a	6,058	--	6,058	1,152	1,152	1,152	--
Management Area 2b	--	6,058	--	4,906	4,906	4,906	6,058
3 Experimental Forest							
Management Area 3	15,379	15,379	15,379	15,379	15,379	15,379	15,379
4 Research Natural Area							
Management Area 4	4,245	3,434	4,245	6,655	7,124	6,015	2,197
5 Special Interest Area							
Management Area 5a	1,109	2,751	1,109	19,410	27,942	15,230	3,391
Management Area 5b	--	--	--	3,178	3,178	--	--
6 Wild and Scenic River							
Management Area 6a [2]	--	--	--	--	--	--	--
Management Area 6b	1,237	1,237	1,237	1,237	1,237	1,237	1,237
Management Area 6c	13,225	13,225	13,225	13,225	13,225	13,225	25,788
7 Old-Growth Grove							
Management Area 7	2,730	853	2,730	4,906	6,655	3,029	199,883
8 T & E Species [3]							
Management Area 8	1,472	1,472	1,472	1,472	1,472	1,472	1,472

Table S-2 Cont. Management Area Acreage of Alternatives

	Alternatives						
Management Areas	**NC**	**K**	**A**	**J**	**W**	**D**	**L**
9 Special Habitat [4]							
Management Area 9a	--	82,782	81,075	70,560	69,045	121,248	37,541
Management Area 9b	--	10,857	11,262	10,025	9,513	8,788	7,146
Management Area 9c	--	15,870	15,742	14,867	14,568	13,182	10,601
Management Area 9d	--	9,364	--	14,888	31,355	17,555	35,386
10 Dispersed Recreation							
Management Area 10a	--	--	--	2,090	299	2,794	--
Management Area 10b	17,747	41,849	17,213	15,699	19,645	3,455	28,049
Management Area 10c	--	--	--	7,977	8,873	29,947	38,245
Management Area 10d	15,956	--	12,883	2,112	960	6,911	--
Management Area 10e	55,181	4,949	55,181	72,672	69,898	163,655	93,746
Management Area 10f	--	2,773	--	3,008	3,605	2,901	341
11 Scenic							
Management Area 11a	--	96,369	--	201,227	138,176	86,080	--
Management Area 11b	--	19,218	--	363	256	1,386	--
Management Area 11c	23,529	26,748	19,133	52,322	70,090	114,239	184,057
Management Area 11d	49,294	3,925	41,999	39,844	24,316	41,188	--
Management Area 11e	12,883	7,892	11,134	5,972	8,212	4,074	51,021
Management Area 11f	52,259	41,892	46,457	43,599	36,347	66,998	122,968
12 Developed Recreation							
Management Area 12a	2,218	2,517	2,218	2,304	2,709	2,581	4,266
Management Area 12b	2,112	2,112	2,112	2,368	2,389	2,133	--
13 Special and Administrative Use							
Management Area 13a	3,839	3,839	3,839	3,839	3,839	3,839	4,543
Management Area 13b	704	704	704	704	704	704	--
14 General Forest							
Management Area 14a	1,011,404	825,899	880,225	610,677	646,320	496,928	195,190
Management Area 14a	--	--	--	597	661	597	--
15 Riparian [5]							
Management Area 15	NA	50,637	47,993	45,389	50,552	47,991	43,600

[1] Wilderness Resource Spectrum management is not applicable to the No change Alternative.

[2] All alternatives include 1,207 acres of Wild and Scenic River designation (wild classification) in the Waldo Wilderness. These acres are included in Management Area 1.

[3] Includes Existing nest area habitat only.

[4] Acres of network sites that overlap with other no harvest management areas are not included in MA9a, 9b, 9c acres. Refer to Figure II-4 FEIS for total habitat acres by alternative.

[5] Riparian acres which are not included in other management areas with no programmed harvest are allocated to MA15. Harvest rates in these Riparian Management Acres differ between alternatives, as described in Chapter II, Riparian. Riparian acres in NC are distributed throughout other management areas.

[6] Alternative L recommends designation of 169,360 acres of roadless area as Wilderness or wilderness study areas.

MAJOR TRADE-OFFS AND ECONOMIC COMPARISONS AMONG ALTERNATIVES

One of the primary reasons for developing alternatives is to provide varities of responses to the issues and concerns affecting the Forest and the public. Each alternative represents a unique approach to issue resolution. While all alternatives address the entire range of issues and concerns, none can successfully resolve all of them concurrently. This is because the issues and concerns reflect the full range of desires for, use of, and outputs from a limited land and resource base. Some of these outputs and uses are competitive or mutually exclusive, thus, creating the need for a variety of issue resolution packages or alternatives. The following is a brief and general description of the issue and concern resolution by alternative.

Old Growth

There are currently 594,800 acres which meet the Region Six definition of old growth. The amount of old growth maintained after 5 decades of harvest ranges from 44% in the NC Alternative to 88% in Alternative L. After 5 decades:

NC - Maintains 44%
K - 51%
A - 57%
J - 57%
W - 61%
D - 62%
L - 88%

Dispersed Recreation

The percentage of the Forest's inventoried potential semiprimitive motor and nonmotorized recreation opportunities provided ranges from 33% to 71%.

NC - Maintains 33%
K - 21%
A - 32%
J - 39%
W - 39%
D - 71%
L - 66%

Roadless Lands

Inventoried lands to be maintained in an undeveloped condition range from 26% to 85%.

NC - Maintains 26%
K - 15%
A - 35%
J - 46%
W - 53%
D - 80%
L - 85%

Scenic Quality

The expected future condition of the Forest's 10 major viewsheds varies according to alternative.

NC - One viewshed remains in a natural appearing condition.
K - None of the viewsheds will be maintained in a natural or slightly altered condition.
A - One viewshed will remain in a natural appearing condition.
J - One viewshed will remain in a natural appearing condition.
W - One viewshed will remain in a natural appearing condition.
D - Six of the viewsheds will remain in a natural appewaring condition.
L - Seven viewsheds will remain in a natural appearing condition.

Allowable Sale Quantity

The amount of timber estimated to be sold annually (in million board feet) ranges from 150 MMBF to 810 MMBF. The acres suitable for timber management range from 553,000 to 1,064,000.

NC - This alternative represents the potential yield of the current timber management plan : ASQ 810 MMBF; landbase 1,064,600 acres.
K - ASQ 650 MMBF; landbase 932,800 acres.
A - ASQ 608 MMBF; landbase 874,300 acres.
J - ASQ 530 MMBF; landbase 853,400 acres.
W - ASQ 491 MMBF; landbase 774,600 acres.
D - ASQ 476 MMBF; landbase 719,400 acres.
L - ASQ 150 MMBF; landbase 553,100 acres.

Water Quality

The risk to water quality and stream conditions varies according to alternative.

NC - Approximately 50% of the Forest land is at High Risk of adverse effects to water quality and stream conditions.
K - Approximately 29% high risk; 27% moderate risk; 44% low risk.
A - Approximately 28% high risk; 25% moderate risk; 47% low risk.
J - Approximately 18% high risk; 17% moderate risk; 65% low risk.
W - All of the Forest is at low risk.
D - Approximately 12% high risk; 10% moderate risk; 78% low risk.
L - All of the Forest is at low risk.

Wildlife and Plant Habitat

Capability of habitats to sustain wildlife populations or effects from management activities varies according to alternative. Distribution of snags and protection of Threatened and Endangered species also varies.

NC - Elk and deer habitat capability declines rapidly; mature and old-growth habitat is maintained in Wilderness; sensitive plant habitat impacted; potential loss of snag dependent species; T&E species protected at minimum levels.

K - Elk and deer habitat capability declines; old growth habitat maintained in Wilderness and habitat networks; sensitive plant habitat impacted; moderate amounts of habitat for snag dependent species; T&E species protected at minimum levels.

A - Elk and deer habitat capability declines in some areas, improves in others; old growth habitat maintained in Wilderness and habitat networks; sensitive plant habitat impacted; low amounts of habitat for snag dependent species; T&E species protected at minimum levels.

J - Elk and deer habitat capability increases; old growth habitat maintained in Wilderness and habitat nteworks; sensitive plant habitat moderately impacted; moderate amounts of habitat for snag dependent species; T&E species protected at minimum levels.

W - Elk and deer habitat capability increases; old growth habitat linked by corridors; sensitive plant habitat protected; moderate amounts of habitat for snag dependent species; T&E species and habitat protected.

D - Elk and deer habitat capability increases; quality and distribution of old growth habitat increases; sensitive plant habitat protected; high amounts of habitat for snag dependent species; T&E species and habitat protected.

L - Elk and deer habitat capability increases; old growth habitat at high levels Forest-wide; sensitive plant species rarely impacted; high amounts of habitat for snag dependent species; T&E habitats and species protected.

ECONOMIC COMPARISONS OF ALTERNATIVES

The economic implications of alternatives are displayed in Table S-3. Variations in costs, benefits, present net value, and cash flows among alternatives are described in this section. These economic indicators could not be reasonably estimated for Alternative NC (No Change) since it is based on a set of assumptions different than those of the other alternatives, and could not be modeled with the current Forest FORPLAN model.

Present net value (PNV) is a quantitative measure of economic efficiency, and thus is a key variable in the comparison of alternatives. It is defined as the difference between the discounted value (benefits) of all outputs to which monetary values or established market prices are assigned and the total discounted costs of managing the planning area. "Discounting" is the procedure used to adjust all future costs and benefits to their present-day equivalent values in order to enable a meaningful comparison of dollar

flows through time. The discounted benefit and cost flows represent the potential net dollar returned for each alternative: the larger the PNV, the greater the potential return.

By providing a monetary, quantitative measure of economic efficiency, present net value is a very useful indicator of differences among alternatives in terms of their total output of public benefits. A full assessment of net public benefits, however, also requires a consideration of primary benefits and costs that have not been assigned a dollar value. Included in this category are outputs such as increased populations of some wildlife species, and physical conditions such as the maintenance of scenery. The value of such outputs and effects cannot be reasonably reflected in dollar terms because the data and/or methodology needed to do so are not available.

Another aspect of describing differences among alternatives and ultimately selecting a Preferred Alternative is the degree of issue resolution. Secondary benefits and costs, such as employment, are often important for understanding the degree of issue resolution.

Table S-3 displays the present net value, total discounted benefits, and total discounted costs for each alternative. Alternatives are ranked in order of decreasing present net value. Change in PNV between alternatives measures the net economic value of the priced outputs that would be forgone if an alternative with a lower PNV were selected.

Variations in present net value among alternatives are due to the wide range of possible costs and benefits represented in the alternatives. Each alternative is designed to produce a unique set of both priced and nonpriced outputs and effects, each of which generates a distinct pattern of values and costs.

Table S-3. Present Net Value, Discounted Benefits, and Discounted Costs[1]

Item	Alternative						
	NC[2]	K	A	J	W	D	L
PNV	NA	3,503	3,184	3,060	2,858	2,780	1,607
Discounted Benefits							
Timber	NA	5,465	5,123	4,520	4,131	4,010	1,281
Market Recreation Value	NA	6	5	6	7	6	6
Other	NA	1	1	1	1	1	1
Nonmarket Recreation	NA	1,403	1,234	1,329	1,346	1,421	1,354
Total	NA	6,875	6,363	5,856	5,485	5,438	2,642
Discounted Costs							
Recreation[3]	NA	(145)	(113)	(125)	(140)	(170)	(134)
Fish & Wildlife	NA	(141)	(130)	(103)	(96)	(110)	(79)
Range	NA	(1)	(1)	(1)	(1)	(1)	(1)
Timber[4]	NA	(438)	(421)	(384)	(350)	(356)	(130)
Water/Air/Soils	NA	(38)	(38)	(37)	(36)	(37)	(27)
Minerals/Geology	NA	(8)	(8)	(7)	(6)	(6)	(2)
Lands	NA	(11)	(11)	(11)	(11)	(11)	(11)
Facilities (Roads)	NA	(403)	(376)	(354)	(327)	(284)	(195)
Planning	NA	(2)	(2)	(1)	(1)	(1)	(1)
Protection	NA	(166)	(1,58)	(134)	(124)	(126)	(40)
Administration	NA	(132)	(125)	(108)	(99)	(98)	(33)
Purchaser's Costs	NA	(1,885)	(1,797)	(1,531)	(1,435)	(1,458)	(383)
Total		(3,370)	(3,179)	(2,796)	(2,626)	(2,658)	(1,036)

[1]Direct comparisons of benefits and costs in millions of 1982 dollars displayed for individual resource outputs provide general indications of relationships but may be misleading because many multiple-use outputs have common costs of production which cannot be reliably separated and attributed to individual resources. Alternatives displayed in order of decreasing present net value.

[2]NA = Data Not Available; could not be reasonably estimated, or compared to other alternatives, since Alternative NC (No Change) is based on a significantly different set of assumptions than the other alternatives, and could not be modeled with the current Willamette National Forest FORPLAN model. The alternative NC Description under "Alternatives Considered in Detail," of Chapter II in the FEIS describes these differences.

[3]Costs are for the Wilderness and recreation programs.

[4]Includes all timber-related costs except roads.

The principal factors influencing the level of priced benefits, costs, and present net value on the Forest are the amount and timing of timber harvest. Since this activity has relatively large investment costs and dollar returns associated with it, the volume harvested is the primary determinant of the magnitude of the economic criteria in each alternative. The timing of harvest (i.e., the adherence to a nondeclining yield schedule) is also very important. A departure from nondeclining yield accelerates investments and returns, thereby increasing PNV.

Other priced outputs, such as semiprimitive recreation opportunities, anadromous fish production, and fish and wildlife use, cannot compete with timber harvest economically and would not be produced at levels that affect timber harvest volumes or schedules based solely on economic efficiency criteria. Objectives for these resources can only be achieved through the use of constraints, specific prescriptions, or land allocations. To the extent that these objectives reduce the available timber harvest land base or restrict harvest through longer rotations, limits in harvest unit sizes, or other means, a reduction in present net value can be expected.

Economic values associated with potential future production of locatable minerals, oil and gas, geothermal energy or hydroelectric power are not included in alternatives. The possibility of future development of mineral and energy resources on the Forest does exist. However, the timing of development and the magnitude of production are both highly speculative. It is possible that the economic value of these activities will vary by alternative if they are undertaken.

Comparison of total economic benefits to total costs measures the overall economic efficiency of each alternative. Another important consideration is the flow of dollars to and from the U.S. Treasury. In this comparison the important factors are receipts (the portion of total market output collected as fees or payments) and budget costs. The difference between the two is the net cash flow to or from the Treasury. Net cash flows for the 1st, 2nd, and 5th decades for each alternative are also displayed in Table S-3. The major differences among both economic values and cash receipts are due to different levels of timber production. Over 99% of the revenues received by the Forest are from the sale of timber.

The columns labelled "Noncash Benefits" in Table S-3 represent the total estimated dollar value of the nonmarket resources to which values have been assigned. They are presented to give the reader an idea of the relationship between the actual receipts generated by the alternatives and the value of the nonmarket outputs to which values have been assigned.

Differences in noncash benefits to users generally vary inversely with harvest levels because of the relationship between harvest and recreation-related outputs. Thus, within the range of alternatives, noncash benefits increase as net receipts decrease. Second and fifth decade noncash benefits reflect anticipated increases in recreation use which accounts for a general rise in benefits.

MAJOR TRADE-OFFS AMONG ALTERNATIVES

This section summarizes the relationships and trade-offs among alternatives in terms of the selected issues and economic criteria. The purpose is to highlight major economic and noneconomic trade-offs that can be quantified by using indicators of responsiveness to issues as a means of comparing alternatives. Table S-4 displays the results for each indicator by alternative.

The indicators that could be estimated for the No Change Alternative are displayed in Table S-4. Many indicators could not be reasonably estimated because Alternative NC (No Change) is based on a different set of assumptions than the other alternatives, and could not be modeled with the current FORPLAN model.

Most issue indicators follow consistent patterns throughout the range of alternatives. The primary relationship associated with most indicators is the level of timber harvest in an alternative. Levels of economic indicators (present net value, net cash flows, payments to counties, jobs, and income) and of firewood are positively correlated with the amount of timber harvest in an Alternative. The amount of lands allocated for roadless, semiprimitive, and scenic management, and the level of spotted owl habitat and old-growth remaining are complementary with each other and negatively correlated with the level of timber harvest. Higher levels of timber harvest generate higher levels of potential adverse watershed impacts and greater amounts of erosion.

Table S-4 displays the specific data for each issue indicator and alternative.

Table S-4. Tradeoffs of Economic Benefits and Indicators of Response to Issues

Issues	Max PNV Bench -mark	Units	NC	K	A	J	W	D	L
Economics									
PNV	3.8	$MMM	NA[3]	3.5	3.2	3.1	2.9	2.8	1.6
Cash Flows 1st decade		$MM/Yr	NA	66	62	54	52	42	6
5th decade		$MM/Yr	NA	88	79	86	72	52	6
Noncash Benefits 1st Decade	39	$MM/Yr	39	40	41	41	40	38	41
5th decade		$MM/Yr	NA	71	53	60	62	74	63
Payments to Counties	33	$MM/Yr	39	32	30	27	25	23	8
Changes in Income[1]	NE[2]	$MM/Yr	156	74	53	14	-6	-15	-173
Changes in Jobs[1]	NE[2]	Number	5653	2945	2218	900	204	-167	-5499
Timber									
ASQ[7]	660	MMBF	810	650	608	530	491	476	150
ASQ[7]	113	MMCF	146	117	110	95	87	86	27
Long-Term Sustained Yield	123	MMCF	146	120	114	108	95	94	34
Recreation									
Special Interest Areas	NE[2]	M Acres[4]	1.1	2.8	1.1	22.6	31.1	15.2	3.4
Trail Construction[7]	NE[2]	Miles	0	0	0	4.0	6.0	6.8	4.0
Semiprimitive Nonmotorized		M Acres[4]	75.3	14.4	72.2	89.5	85.8	176.5	102.0
Semiprimitive Motorized		M Acres[4]	23.9	48.3	23.4	31.3	36.0	38.2	66.3
Water									
Low Watershed Risk[6]	NE[2]	% Area	NA	41	47	65	100	78	100
Moderate Watershed Risk[6]	NE[2]	% Area	NA	27	25	17	0	10	0
High Watershed Risk[6]	NE[2]	% Area	NA	29	28	18	0	12	0
Erosion (Debris Slides)[7]	NE[2]	M C.Yds	NA	85.6	80.3	67.0	28.5	33.4	23.9
Wildlife									
Spotted Owl Habitat	59	# Areas[4]	0	59	59	59	59	102	184
Elk Population	NE[2]	M Elk[6]	NA[3]	3.7	4.2	4.5	4.8	5.6	5.6
Deer Population	NE[2]	M Deer[6]	NA[3]	17.8	19.5	23.1	24.9	28.4	26.6
Scenic Quality									
Retention		M Acres[4]	88.6	72.0	77.9	90.5	118.8	142.1	265.1
Partial Retention		M Acres[4]	114.3	147.5	150.1	177.7	171.7	246.7	286.3
Modification		M Acres[4]	4.5	123.6	4.5	206.2	143.0	108.4	4.5
Old Growth									
Acres Remaining After 10 Years		M Acres	494.0	522.4	528.4	534.9	533.4	537.2	578.3
Roadless									
Area Allocated to Roadless	0	M Acres[4]	45.4	25.3	59.8	79.7	92.1	136.9	145.9

[1]Changes represent the total potential change in the 1st decade as compared to historical averages over the life of the current Forest Plan (1977-1985).
[2]NE = Not estimated, benchmarks were not analyzed as fully developed implementable alternatives.
[3]NA = Data Not Available; could not be reasonably estimated, or compared to other alternatives, since Alternative NC (No Change) is based on a significantly different set of assumptions than the other Alternatives, and could not be modeled with the current Forest FORPLAN model. See alternative Considered in Detail, Chapter II for additional information.
[4]Represents lands allocated to meet this objective.
[6]Percent of total Forest area at the end of the 1st decade in this watershed risk category. See Chapter IV, Water for further explanation.
[6]Represents end of 1st decade conditions.
[7]Units are average annual for 1st decade.

ENVIRONMENTAL CONSEQUENCES

THE RELATIONSHIP BETWEEN SHORT-TERM USES OF THE ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

Long-term productivity gains through use of various management practices on the Forest are of several types. Practices such as the replacement of old slower-growing timber types with younger, productive stands, the use of commercial tree thinning, and the use of prescribed fire to improve wildlife habitat have measurable long-term economic gains.

Wood fiber production will be increased over the long run as some of the old-growth stands are harvested and converted to more productive second growth stands. Opportunities for dispersed recreation use, including hiking, camping, fishing, hunting, snowmobiling, sightseeing, and cross-country skiing will be maintained and increased for future generations.

While some forest practices can cause losses such as temporary increases in soil erosion and temporary displacement of certain wildlife species, on the whole the ecosystem remains in balance with productivity gains exceeding losses in the long-term. For example, timber management activities such as clearcutting and prescribed burning alter the natural appearing landscape and have a short-term adverse impact on the scenic values. These impacts are reduced within several years with vegetative recovery and are mitigated in the long-term by integrating the principles of landscape management into all Forest management practices and activities.

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

An irreversible commitment of resources results from a decision to use or modify resources that are renewable only over a long period of time, such as soil, or nonrenewable resources such as cultural resources or minerals. The proposed Forest Plan and the alternatives examined are based on the principles of multiple-use and long-term productivity for all resources. Measures to protect natural resources that could be irreversibly affected by management practices are incorporated into Forest-wide standards and guidelines.

Removal of mineral or energy resources is an irreversible commitment of resources. The removal and utilization of rock resources for road construction would be an example of a common use on the Forest.

Soil erosion, as a result of management activities, is an irreversible loss; once the soil particles are removed from the site and deposited into a stream or river, they are no longer available.

An irretrievable commitment of resources is a use of resources that are lost because of land management objectives. This represents opportunities foregone for the time that the resource cannot be used. An example of an irretrievable commitment might be the loss of wildlife habitat where the management objective for an area is developed recreation.

The development of roadless areas would mean an irretrievable loss of the characteristics which qualify these areas for Wilderness designation. On the other hand, not developing roadless areas is an irretrievable loss of opportunities for vegetation management. This could result in lower volumes of timber harvest and forage being produced on the Forest.

Irretrievable loss of timber production could result from stands being designated as old-growth wildlife habitat, reserved for cultural resource protection, or dedicated for other uses such as arterial and collector roads, administrative sites, and developed recreation sites. Insects, diseases and fire can also cause irretrievable losses to vegetation.

PROBABLE ADVERSE ENVIRONMENTAL EFFECTS WHICH CANNOT BE AVOIDED

Under any alternative, some adverse impacts to the environment could be expected to occur which cannot be completely mitigated. However, the application of the management prescription standards and guidelines is intended to limit the extent and duration of these effects. Given the limited supply of an undisturbed Forest setting, extensive Forest use will diminish opportunities for a sense of remoteness, naturalness, and solitude in the Forest. Adverse effects of timber harvest, road construction, increased dispersed recreation use and the development of recreation sites include impacts such as disturbance to vegetation, compaction of soil, impacts on water quality, increases in noise levels, and disturbance of game animals and their habitat.

Fire hazard and resistance to control will increase subsequent to logging and thinning operations as a result of increased timber residues. Fire risk also increases as a result of more people using an area during and after management activities.

Air quality will diminish on a local and temporary basis due to prescribed burning.

In unroaded areas, development activities such as timber harvesting and road construction associated with harvest, recreation, or other purposes will have an adverse effect on the potential future management of these areas as designated Wilderness, as Research Natural Areas, or for other purposes requiring natural characteristics.

The disturbance or displacement of fish and wildlife may occur as a consequence of increased human activity on project areas.

The disturbance or destruction of some artifacts and sites is liable to occur as a result of some management activities. This would be especially true for subsurface sites that cannot be located through surface surveys.

SIGNIFICANT CUMULATIVE EFFECTS

The majority of watershed research conducted on the Forest indicates that when the percentage of a watershed in immature timber stands increases beyond 25% to 30%, changes may occur in the quality, quantity and timing of runoff. The ability of a drainage to absorb impacts is determined by a wide range of variables including soils, vegetation, slope, stability, aspect, past and present management including timber harvest, road construction, and use.

A cumulative effect of disturbing artifacts and sites is the loss of information about the prehistory and history of an area. This inhibits the efforts of historians and anthropologists to describe accurately the cultural history of the Forest and its relationship to other parts of the region. As a result, cultural sites and artifacts on Forest land may become more important over time.

As natural settings are altered through timber harvest and road construction, the capacity of the Forest to provide some types of dispersed recreational settings and experiences is diminished. The greater the

shift from unroaded recreation to roaded recreation in the alternatives, the greater the cumulative effect on semiprimitive (motorized and nonmotorized) recreation opportunity settings.
As road construction and timber harvest activities are implemented over several decades, they have the potential to affect an increasing amount of trail mileage.

While a single activity may only affect its immediate surroundings, many activities over several years or decades will diminish the scenic quality of a much larger area. This effect has even greater consequence in areas where private or other public agency land is adjacent to the Forest. Areas with large blocks of intermingled ownership may display these effects most significantly. It is assumed that private landowners having a large timber inventory will harvest timber and will not keep the landscape in a natural appearing condition. This "checkerboard" effect will be most apparent in the North Santiam, South Santiam, and Middle Fork of the Willamette drainages and to a lesser extent in the McKenzie drainage and around the community of Oakridge.

Approximately 22% of the Forest is currently designated Wilderness. This has the effect of natural state preservation of the water, vegetation, soil, and air quality. The nondesignation of suitable lands may result in the development of such land and over time these may become unsuitable for future Wilderness consideration. Another effect on Wilderness is the development, such as timber harvest and road construction, that may occur adjacent to Wilderness boundaries. This effect may result in physical changes that over a period of time can influence the Wilderness opportunity to be provided. Improved access could result in a greater number of visitors entering the Wilderness at more locations, adversely affecting the type of recreation experience currently provided. Each alternative proposes different levels of development for different amounts of the inventoried roadless areas. As roads are constructed and timber sale units are harvested, roadless areas will be altered in size and shape. In addition, roadless areas adjacent to other allocations and landownerships are subject to the external influences of their management. These effects will alter the potential of individual areas to provide Wilderness quality experiences and opportunities in the future.

As natural settings are altered through timber harvest and road construction, the capacity of the Forest to provide some types of Special Interest Area, National Natural Landmark, and Research Natural Area settings is diminished. Changes to vegetation patterns, surface drainage, and soil horizons on land adjacent to established Special Interest Areas, National Natural Landmarks, and Research Natural Areas may over a period of time affect the natural processes of individual areas or result in an eventual loss of research potential.

In general, alternatives which harvest more acres of timber will gradually result in younger age classes, fewer stands of old-growth, and a younger average age of timber stands in the Forest. Along with the younger ages will come smaller average tree sizes. There will be less defect and breakage as diseases and deformities found in mature and overmature tree have less chance to develop in the younger stands. As more stands are harvested and managed for timber production, there will be a gradual decrease in the population of the more shade tolerant climax species, such as western hemlock and Pacific silver fir. Laminated and blackstain root rots may show some increase with intensive management but losses can be minimized by planting and favoring resistant species and timing precommercial thinning to minimize spread of disease by insects seeking out the fresh cut stumps.

The per acre yield of commercial products from the Forest will increase as stands are managed to maintain fast growth rates by controlling competition. Growth will also be enhanced through fertilization, (except in Alternative NC), and genetic selection. Cross-breeding for desirable genetic traits will provide greater increases in successive generations. Care must be taken to avoid reducing genetic diversity which could make the Forest increasingly susceptible to insects and disease. All alternatives meet or

exceed the requirement that the growth rate by the year 2030 be 90% of long-term sustained yield capacity.

ORGANIZATION OF THE DOCUMENTS

The complete set of Willamette National Forest planning documents includes: (1) Final Environmental Impact Statement (FEIS), (2) Appendices to the FEIS, (3) Forest Plan, (4) FEIS Summary, (5) Resource and Alternative Maps, and (6) Record of Decision.

This document organization guide is provided to assist the reader in understanding what information is presented in each of the planning documents. A thorough reading of the FEIS will aid in understanding the implications of the Proposed Action, which is the basis for the Forest Plan.

In addition to the material included in the FEIS, Forest Plan, and supporting Appendices, other information and records are available during regular business hours at the Willamette National Forest Supervisor's Office; 211 East Seventh Avenue; Post Office Box 10607; Eugene, Oregon 97440.

Final Environmental Impact Statement

Chapter I: "Purpose and Need" identifies the laws and regulations which direct the planning process. Chapter I identifies the public issues and management concerns about the land and resource management of the Willamette National Forest.

Chapter II: "Alternatives Including the Proposed Action" presents the seven alternatives selected for analysis, explains their formulation, indicates response of the alternatives to the issues, and provides a basis for choice among the range of alternatives. The alternatives are compared on the basis of their outputs of goods and services in response to the issues. The alternatives selected for display in the FEIS are Alternatives NC (No Change), A, D, J, K, L, and W (Preferred Alternative).

Chapter III: "Affected Environment" describes the environment of the area to be affected by the range of alternatives under consideration. Information includes the physical and biological setting, the social and economic setting, and the current situation of specific Forest resources.

Chapter IV: "Environmental Consequences" discusses the environmental impacts of the Alternatives, any adverse environmental effects which cannot be avoided should the preferred alternative be implemented, the relationship between short-term human uses of the environment and the maintenance and enhancement of long-term productivity, and any irreversible or irretrievable commitments of resources which would be involved in the preferred alternative should it be implemented.

Other Sections of The FEIS

List of Preparers: Identifies the Interdisciplinary Team Members and provides a brief description of their roles, education, and experience.

List of Agencies and Organizations to whom copies of Forest planning documents have been sent.

References: The list of the works referred to in the FEIS.

Glossary: Terms, their definitions and abbreviations.

Index: Provides the page locations of topics discussed within the planning documents.

Appendices to the FEIS

The Appendices present the more technical or detailed information involved in the planning process.

Appendix A presents a chronology of public involvement activities which were used to determine the issues to be addressed. It includes background on issue development, a listing of the various publics contacted and/or consulted, and the issues selected to be addressed in the FEIS.

Appendix B describes the analysis process used in developing the alternatives. It details the quantitative methods used to perform the analysis.

Appendix C provides a description of each of the inventoried roadless areas on the Forest.

Appendix D contains information about the standards and guidelines, and the management area prescriptions which do not apply to the preferred alternative, but which may apply to other alternatives. The M.A. Prescriptions which apply to the preferred alternative are in Chapter IV of the Forest Plan.

Appendix E describes the analysis and study of rivers on the Forest that are designated, under study, or eligible for inclusion in the Wild and Scenic Rivers System.

Appendix F describes the rationale used to determine the appropriate harvest systems implemented in managing coniferous forest stands on the Forest during the next 10 years on those lands where timber production is prescribed.

Appendix G describes the analysis used and considerations in determining how management requirements for soil, water quality and wildlife habitat could be met and the potential effects on various resources.

Appendix H outlines the Best Management Practices that would be used in any of the alternatives to meet water quality objectives.

Appendix I presents a summary of the comments received on the DEIS and Proposed Forest Plan including Forest responses to the substantive comments.

Forest Plan

The Forest Plan contains management direction for the Forest land and resources based on the Preferred Alternative identified in the FEIS. It contains the detailed standards and guidelines for management practices.

Summary of the FEIS

The **Summary** is a brief overview of the material contained in the FEIS.

Map Packet

The **Map Packet** contains the alternative maps which display the allocations of management areas by alternative. It also contains a separate planimetric map of the Preferred Alternative at a 1/2 inch to 1 mile scale displaying management area boundaries and locations.

Record of Decision

The Record of Decision clarifies what decisions are being made and the rationale behind them.

CHAPTER I

PURPOSE AND NEED

INTRODUCTION

National Forest Land and Resource Management Planning is a process for developing, adopting, and revising land and resource management plans for the National Forest System as required by the Forest and Rangeland Renewable Resources Planning Act of 1974 (RPA), as amended by the National Forest Management Act of 1976 (NFMA). The resulting Land and Resource Management Plans (Forest Plans) provide for multiple use and sustained yield of goods and services from the National Forest System in a way that maximizes long-term net public benefits in an environmentally sound manner. The National Forest System Land and Resource Management Planning process is described in Title 36, Part 219 of the Code of Federal Regulations.

The purpose of this Final Environmental Impact Statement (FEIS) is to provide decisionmakers with an environmental disclosure sufficiently detailed to aid in the selection of a Forest Plan, which contains new management direction for the Forest. Equally important, its purpose is to make information available to the public, and to encourage public participation regarding the development and refinement of that direction. This document discloses the planning process and analysis of the significant environmental effects of a proposed action and 6 other alternatives for the future management of land and resources of the Forest.

Each alternative in the DEIS addresses local, regional, and national public issues, management concerns and opportunities (ICOs); provides for use and protection of resources; and fulfills legislative requirements. Every alternative generates a different mix of goods and services from the Forest. In the analysis, outputs and effects are projected for five decades to indicate long-term implications.

The Preferred Alternative is the "proposed action" (40 CFR 1502.14) which provides for a level of multiple-use and sustained yield of goods and services that is judged to best maximize long-term net public benefits in an environmentally sound manner while responding effectively to all the public issues. Net public benefits represents the cumulative net value of all Forest outputs and activities, whether assigned a dollar value or not.

The Preferred Alternative, as modified by the Record of Decision, is the basis for the accompanying "Willamette National Forest Land and Resource Management Plan" which is a separate document. The purpose of the Forest Plan is to direct all natural resource management activities on the Forest. The Forest Service is required to revise the plan within 15 years of its adoption and this revision may establish different long-term goals with different projected effects and outputs. The Forest Plan may also be amended any time during the next 10 to 15 years if changed conditions or monitoring results indicate adjustments are needed.

While the Forest Plan will guide the management of the Forest for the next 10 to 15 years, the analysis in the FEIS covers a planning horizon of 50 years to evaluate and display the long-term effects of actions during the planning period. This evaluation has two purposes. First, it presents a long-term analysis for decisionmakers and the public of the management necessary for each alternative to achieve and maintain the optimum level of regular periodic outputs of various resources. Secondly, the long-term

analysis allows net public benefits to be maximized while responding effectively to all the public issues without impairment to the productivity of the land (16 U.S.C. 531). The analysis also provides an estimate of the level of long-term outputs for each alternative based on an unconstrained budget and maximization of net public benefits, subject to responding effectively to the public issues.

Preparation of an Environmental Impact Statement is required because the Forest Plan is a major federal action which may have a significant effect on the quality of the human environment. Its development follows the direction of the National Environmental Policy Act of 1969 (NEPA) and the Council on Environmental Quality (CEQ) NEPA Regulations (40 CFR 1500-1508). For purposes of disclosure under NEPA, this DEIS and the accompanying Proposed Forest Plan are treated as combined documents.

A list of references cited in the FEIS and a glossary defining terms, units and abbreviations are located at the back of this document. The reader will find it useful to consult the land management allocation maps for each alternative when reviewing this FEIS. The maps are in a separate packet accompanying this document. A complete description of the direction and emphasis for each of the management areas displayed on the maps is in Chapter II, Comparison of Alternatives.

Disposition Of Previous Plans

The Final Forest Plan will incorporate or replace previous land management and resource management plans prepared for the Forest.

The following plans will be replaced by the Forest Plan:

- Multiple Use Land Management/Timber Management Plan (1977)
- Mt. Jefferson Wilderness Management Plan (1977)
- Three Sisters Wilderness Management Plan (1974)
- Lava Fire Management Plan (1978)
- Trail Management Plan (1980)
- Waldo Lake Recreation Area Plan (1962)
- Off-Road Vehicle Plan (1974)

The following plans will be incorporated as part of the Forest Plan:

- Land Ownership Adjustment Plan (1974)
- Lamb Butte Special Interest Area Plan
- Research Natural Area Establishment Reports

Ollalie Ridge (1963)
Gold Lake Bog (1965)
Wildcat Mountain (1968)
Middle Santiam (1979)

- Geothermal Development Plans

  Breitenbush Area FEIS (1978)
  Belknap-Foley FEIS (1981)

- Willamette Pass Alpine Winter Sports FEIS (1985)

- Crale Creek Bald Eagle Management Plan (1982)

- Hills Creek Reservoir Bald Eagle Management Plan (1983)

Upon implementation, Forest management activities will comply with the Forest Plan. Appropriated budgets may alter the schedule of activities. In addition, all permits, contracts, and other instruments for the use and occupancy of National Forest System lands and resource uses must be in conformance with the Forest Plan as soon as possible (36 CFR 219.10(e)).

Changes Between Draft And Final

The Draft Environmental Impact Statement (DEIS) and Draft Forest Plan were released to the public in December 1987. Changes that have occurred since the DEIS are incorporated in this FEIS. Many of these changes are in response to public comments on the DEIS and Draft Forest Plan. Included are revisions and updates to data and technical modeling procedures used in the analysis, as well as modifying alternatives presented in the DEIS and the development and analysis of additional alternatives. A complete listing of the analytical and technical changes can be found immediately follow the introduction to Chapter II of this document.

The final Supplement to the EIS (SEIS) for an Amendment to the Pacific Northwest Regional Guide (USDA Forest Service 1988) was issued in July 1988 and provides Regional guidelines for maintaining viable populations of northern spotted owls. The new management direction was incorporated in the FEIS resulting in changes in the habitat network and standards and guidelines.

The Oregon Omnibus Wild and Scenic Rivers Act of 1988 designated approximately 12.7 miles of the McKenzie River and 42.3 miles of the North Fork of the Middle Fork of the Willamette River as Wild, Scenic and Recreation rivers. The South Fork of the McKenzie River and Blue River were specified as Study Rivers in the Act also.

The Pacific Northwest Region's FEIS for Managing Competing and Unwanted Vegetation (USDA Forest Service 1988) was released since the DEIS. Changes were made to standards and guidelines to be consistent with the guidelines presented in the FEIS and to reflect a reduced emphasis on herbicide use.

All of the changes mentioned above are discussed in greater detail in Chapter II, Changes Between Draft and Final and Description of Alternatives.

Changes specific to Chapter I, Purpose and Need, primarily involve additional information and clarification of the 7 key issues that were identified through initial scoping efforts and displayed in the DEIS. Public comments on the DEIS and Draft Forest Plan are the principal source of these changes. Although the number of comments received were voluminous (over 170,000 comments in 17,000 individual replies), almost of all of them were related to the original issues. While many simply restated earlier input from the scoping process, others helped to clarify specific points or identify new aspects within the broader issues that were not recognized during the scoping phase or have developed in the 4 to 5 years between scoping and the DEIS release. Public response also served as an indicator of the intensity of the individual issues and how this may have changed during the planning process.

In response to the comments, all of the key issues were reviewed to determine if they were current and accurately portrayed concerns raised in public comments in the FEIS. Where necessary, the ICOs have been updated to keep them current and within the scope of the planning process. In addition to the discussion of ICOs in this section of the document, further information is available in Appendix A, *Issues, Concerns and Opportunities* about specific changes and refinements in ICOs between the DEIS and FEIS.

PLANNING PROCESS

To put forest planning in perspective, it is important to have a general understanding of the overall Forest Service planning process. As required by RPA, NFMA, and the related implementing regulations cited above, the Forest Service has a three-level, integrated planning process.

At the national level, the RPA Program establishes long range resource objectives based on the present and anticipated supply of, and demand for, various resources. A portion of each national resource objective included in the RPA Program is distributed to each of the nine Forest Service Regions in the nation.

At the regional level, a Regional Guide is developed. The Regional Guide presents the distribution of its portion of the national objectives to each National Forest. In addition, the Regional Guide establishes Regional management standards and guidelines. The *Regional Guide for the Pacific Northwest Region* of May 1984 provides this direction for the Forest.

At the National Forest level, a Forest Plan is proposed from the analysis of a set of alternatives that reflect a range of resource objectives, outputs, and effects. One or more of these alternatives are developed to meet or exceed the current RPA Program objectives displayed in the Regional Guide. The alternative development process is described in Chapter II.

The RPA Program is submitted to Congress as an aid to determine appropriation and authorization of the agency's annual budget. Since allocations in the annual budget have a major effect on management activities, many of the Forest's actual outputs and environmental effects are ultimately determined in large part by the annual budget. Through implementation of the Forest Plan and annual budget commitments, the planning process is responsive to public issues and resource capabilities of the Forests.

The planning process is a cyclic process. The information from the Forest level flows up to the national level, is incorporated in the RPA Program, then flows back to the Forest level. In this way, the information regarding resource capabilities and demands is incorporated into the RPA Program.

The planning process specified in the NFMA implementing regulations and the environmental analysis process specified in the CEQ regulations were used in developing this FEIS and the accompanying Proposed Forest Plan. The planning steps employed are:

Identification Of Purpose And Need

This first step is focused on the identification and evaluation of public issues, management concerns and resource use and development opportunities. It is the phase in the process where the major issues, concerns, and opportunities to be addressed in the planning process are determined.

Preparation Of Planning Criteria

Criteria are prepared to guide: collection and use of inventory data and information; analysis of the management situation; and the design, formulation, and evaluation of alternatives. Specific criteria are derived from laws, executive orders, regulations, and agency policies; goals and objectives of the RPA Program and the Pacific Northwest Regional Guide; plans and programs of other agencies; ecological, economic, and technical factors; and resource integration and management requirements specified in the NFMA Regulations.

Inventory Data And Information Collection

Current information and inventory data, including maps and graphic material, appropriate for planning and managing forest resources are collected and maintained. This may require special inventories or studies to be prepared to address emerging issues or changes in planning direction.

Analysis Of The Management Situation

The analysis of the management situation is a determination of the ability of the planning area covered by the Forest Plan to supply goods and services in response to society's demands. The purpose of this analysis is to provide a basis for formulating a broad range of reasonable alternatives and includes benchmark assessments to define resource capability ranges within which alternatives can be constructed.

Formulation Of Alternatives

Alternatives are formulated, in accordance with NEPA procedures, that reflect a broad range of resource outputs and effects and are responsive to public issues and management concerns.

Estimated Effects Of Alternatives

The physical, biological, economic, and social effects of implementing each alternative that is considered in detail are estimated and compared. The purpose of this step is to estimate objectively what the effects would be, given implementation of any one of the alternatives considered in detail.

Evaluation Of Alternatives

The evaluation includes an analysis of the aggregate physical, biological, economic, and social effects of the management alternatives and provides a comparative assessment of present net value, social and economic impacts, outputs of goods and services and overall protection and enhancement of environmental resources.

Recommendation Of A Preferred Alternative

The Draft Environmental Impact Statement (DEIS), which identifies the Preferred Alternative, and the Draft Forest Plan, are prepared for public review. This DEIS and the draft Forest Plan are circulated for review and comment, ensuring that environmental information is available to public officials and citizens before decisions are made and before actions are taken. A Final Environmental Impact Statement (FEIS) is prepared and the Preferred Alternative is identified after comments from DEIS are reviewed and evaluated.

Plan Approval And Implementation

The Regional Forester reviews the FEIS and Forest Plan. Upon completion of this review, the Regional Forester makes a decision regarding approval of the proposed Forest Plan. The decision is documented in a Record of Decision (ROD) and is made available to the public, as are the FEIS and Forest Plan.

Upon implementation, the FEIS and Forest Plan will be used for "tiering" in accordance with the CEQ regulations. Tiering means that site-specific environmental analysis conducted for projects arising from the Forest Plan will refer to the FEIS and associated documents rather than repeat information

from those documents. In this way, the environmental documents prepared for a site-specific project will need only to concentrate on issues unique to that project (40 CFR 1508.28).

Monitoring And Evaluating

At intervals established in the Plan, implementation shall be evaluated on a sample basis to determine how well objectives have been met and how closely management standards and guidelines have been applied. Based on this evaluation, revisions or amendments to the Forest Plan may be recommended.

The Forest Plan will ordinarily be revised on a 10-year cycle or at least every 15 years. It also may be revised whenever the Forest Supervisor determines that conditions or demands in the area covered by the plan have changed significantly or when changes in the RPA policies, goals, or objectives would have a significant effect on Forest level programs. In the monitoring and evaluation phase, the interdisciplinary team may recommend a revision of the Forest Plan at any time. Revisions are not effective until considered and approved in accordance with the requirements for the development and approval of the Forest Plan. The Forest Supervisor will review the conditions on the land covered by the Plan at least every five years to determine whether conditions or demands of the public have changed significantly (36 CFR 219.10(g)).

In addition to revisions, the Forest Plan may also be amended (36 CFR 219.10). A Forest Plan amendment may be significant or nonsignificant depending on the scope of adjustment or change that is considered and only changes a specific aspect of the Forest Plan in contrast to a plan revision which revisits the entire set of resource issues and land allocations. Amendments are expected to occur frequently during the life of the plan as monitoring, site-specific analyses or inventory updates indicate specific areas of the Forest Plan that need to be updated or adjusted to reflect current situations. Amendments of limited scope and effects may be done by the Forest Supervisor with a Decision Memo or a Decision Notice.

Additional information and file documents used in the Forest planning process to develop this FEIS and the accompanying Forest Plan are contained in the planning records maintained at the Forest Supervisor's Office, 211 East Seventh Avenue, Eugene, Oregon; they are available during regular business hours.

FOREST OVERVIEW

The Forest is an administrative unit of the Pacific Northwest Region of the Forest Service, U.S. Department of Agriculture, and is located within the Second, Fourth, and Fifth United States Congressional Districts. It lies primarily in Lane, Linn, and Marion Counties, but also extends south into Douglas County, east into Jefferson County, and north into Clackamas County. Figure I-C-1 displays a breakdown of the Forest acreage by county. The Forest headquarters is the Supervisor's Office located in Eugene, Oregon. There are seven Ranger Districts, with offices in Oakridge, Westfir, Lowell, Blue River, McKenzie Bridge, Sweet Home and Detroit. The vicinity map, Figure I-C-2, shows their location, the location of the Forest in Oregon and its relative size.

The Forest stretches for 110 miles along the western slope of Oregon's Cascade Mountains. The western edge of the Forest borders the Willamette Valley from the Mt. Jefferson area east of Salem to the Calapooya Mountains northeast of Roseburg. The crest of the Cascade Range defines the eastern boundary of the Forest.

There are over 1.7 million acres within the Forest boundary--1,675,408 of National Forest land and 123,330 acres of land in private ownership or managed by other public agencies. Over 380,000 acres of land within the Forest have been set aside by Congress to preserve Wilderness character and to conserve portions of the Forest's natural scenery, flora, and fauna. Other dedicated areas include the H.J. Andrews Experimental Forest, the Oregon Cascades Recreation Area, the Lamb Butte Scenic Special Interest Area, and four Research Natural Areas.

The landscape of the Forest is divided into two geological provinces, the Western Cascades and the High Cascades. The steep, deeply dissected valleys of the Western Cascades are geologically older than the High Cascades. Elevations range from 900 feet along the Santiam River to over 10,000 feet at the summits of Mt. Jefferson and the Three Sisters. Most of the Forest lies within an elevation range of 2,000 to 4,000 feet. Broad plateaus, broken by a line of inactive volcanoes along the crest, are characteristic of the High Cascades, which comprise one-third of the Forest. Alpine glaciation has left this terrain marked with U-shaped valleys, moraines, and glacial lakes.

Two-thirds of the Forest lies within the Western Cascades and contains some of the most productive forest land in the United States. Diverse forest vegetation provides habitat for a wide spectrum of wildlife. Nearly 300 vertebrate wildlife species inhabit the Forest, including both game and nongame species.

The Forest has approximately 400 lakes and more than 2,700 miles of perennial streams and rivers. An anadromous fishery, including salmon and steelhead, is found in the Forest's main tributaries. Surface water feeds seven major reservoirs that provide flood control, power generation, streamflow regulation, and recreation. Water for domestic use for rural communities and nearly 205,000 metropolitan users in the Willamette Valley also comes from the Forest's system. The main stream systems of the Forest are the Willamette, McKenzie, and Santiam rivers and their tributaries.

A variety of natural resource related products and services are produced on the Forest. Wood, water, wildlife, and recreation are the primary categories of these. Mild climate and abundant rainfall are extremely favorable to growing magnificent evergreen trees including Douglas-fir, western hemlock, and western red cedar. This Forest is the top timber producer of the 156 National Forests in the United States. The Forest produces about 8% of all timber cut on National Forest lands and provides an average of 750 million board feet of timber to the Nation's economy annually.

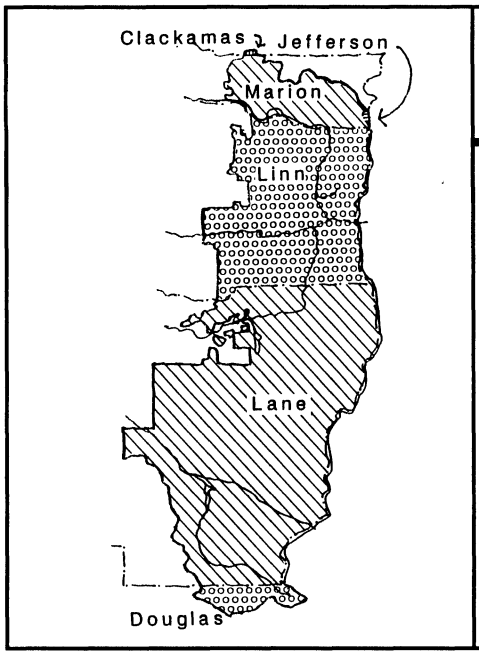
The amenity and commodity resources of the Forest are important nationally, as well as to the people of Oregon. The lumber and wood products industry is the State's number one manufacturing industry, with agriculture and tourism also playing a significant part in the economy of the State. Most of the timber sold by the Forest is processed in counties adjacent to the Forest. Over 25% of Oregon's population lives in urbanized communities located in Lane, Linn, Marion, Benton, and Polk counties, and a majority of this Forest's recreation users comes from these areas.

During all seasons of the year and at all elevations, the Forest environment provides for a variety of recreational experiences, including sightseeing, hiking, camping, boating, hunting, fishing, mountain climbing, downhill and cross country skiing.

Principal highways providing access to the Forest are State highways 22, 58, and 126, and U.S. Highway 20, all east-west routes. The Forest is within a 1 1/2-hour drive from Portland, and a 1-hour drive from Salem, Albany, Corvallis, Bend, and Eugene-Springfield.

A detailed description of the Forest is presented in Chapter III, "Affected Environment."

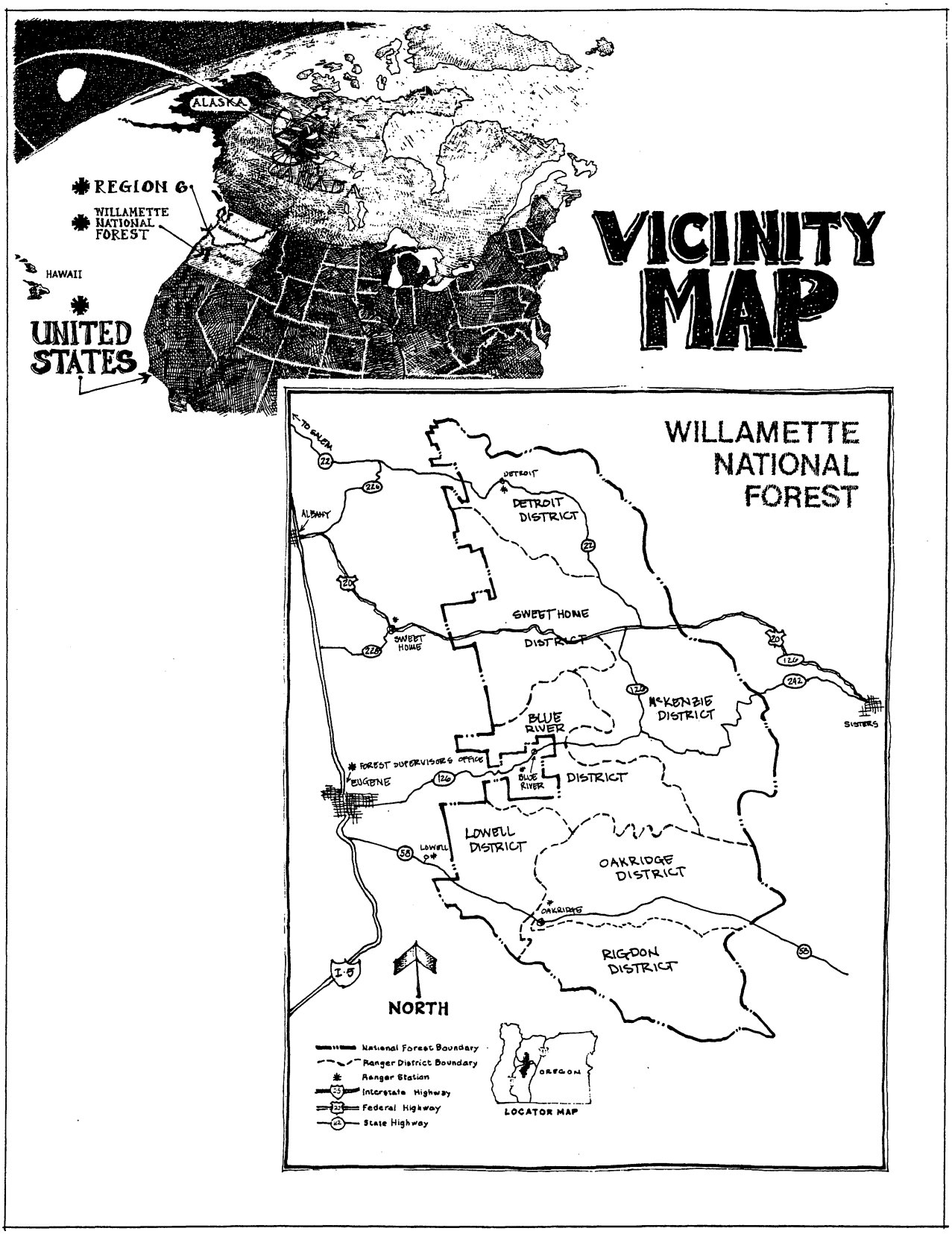
Table T311. Acreage By County (I-C-1)



County	WNF Acres In County	% Of WNF By County	Non-National Forest Acres	Acres Within Forest Boundary
Lane	1,021,941	34.8%	59,233	1,081,174
Linn	465,613	31.7%	56,013	521,626
Marion	136,064	18.1%	8,084	144,148
Douglas	50,296	1.6%	0	50,296
Clackamas	853	0.07%	0	853
Jefferson	640	0.06%	0	640
TOTAL	1,675,407		123,330	1,798,737

Source: Data base LYR06D (Administrative Boundaries).

Figure I-C-2


ALASKA
CANADA
REGION 6
WILLAMETTE NATIONAL FOREST
HAWAII
UNITED STATES
VICINITY MAP
WILLAMETTE NATIONAL FOREST
TO SALEM
ALBANY
DETROIT
DETROIT DISTRICT
SWEET HOME
SWEET HOME DISTRICT
BLUE RIVER
McKENZIE DISTRICT
SISTERS
FOREST SUPERVISOR'S OFFICE
EUGENE
BLUE RIVER DISTRICT
LOWELL
LOWELL DISTRICT
OAKRIDGE DISTRICT
OAKRIDGE
RIGDON DISTRICT
I-5
NORTH
National Forest Boundary
Ranger District Boundary
Ranger Station
Interstate Highway
Federal Highway
State Highway
OREGON
LOCATOR MAP

ISSUES, CONCERNS, AND OPPORTUNITIES

Introduction

The Forest is composed of complex natural ecosystems that can be managed for various combinations of goods and services, land uses, and environmental conditions. Many of these Forest resources, uses, and conditions are interrelated. Different people and groups prefer to see the Forest managed in different ways. Managing the Forest to emphasize some resources may cause changes in others, and tradeoffs are often necessary. There are practical and natural limits to what the Forest can provide without adversely impacting the quality of the environment.

A central task in Forest Planning is the analysis of a range of alternative ways of managing the National Forest. Alternatives are developed which meet legal requirements, and which address and are based on the important public issues and management concerns. Alternatives represent a blend of different resource emphases and combinations of management practices to produce the goods, services, and environmental conditions that people want. The planning analysis considers both the uses of the Forest, and the implications of these uses in ecological and human terms.

The Forest Planning process is guided by the public issues and management concerns which reflect the different preferences of individuals and groups, and the physical, biological, and legal limits on forest management. A public issue is a subject or question of widespread public interest relating to management of the National Forest System. A management concern is an issue, problem, or a condition which affects the range of management practices identified by the Forest Service in the planning process.

Issue Identification

The identification of public issues and the development of planning questions for the current planning effort began in the fall of 1979. An initial draft of existing and/or anticipated issues, concerns, and opportunities was circulated on-Forest to Rangers, Staff and Zone Engineers for review and comment. These issues and concerns were expressed as objectives and a hierarchy from general to specific was developed for the objectives. Facets of the issues were described from the specific statements in the objectives hierarchy. Following this, a response packet was prepared to solicit public comments. These packets were distributed at Forest offices and public meetings and mailed to concerned citizens and industry groups.

Open house sessions were held to explain opportunities for the public to participate in the Willamette's planning process. The sessions were informal and offered assistance in preparing response forms and answering questions. Response forms were returned by January 1981. There were 291 forms returned. An additional 41 items of correspondence were submitted; these were included in the analysis process as documented in the Planning Record.

Development of the final list of issues for Regional Forester submission and approval was the result of an in-depth analysis of the public responses received in early 1981. The final phase of the analysis had, as its central theme, the goal of validation/revision of the objectives hierarchy in terms of suggested revisions, additions, or comments contained in the public responses. The Regional Forester approved the list of issues in May 1981, and they have been used to guide the Willamette's planning process.

The issues are Dispersed Recreation, Developed Recreation, Wilderness, Visual/Scenic, Cultural Resources (Artifacts and Sites), Wildlife and Plant Habitat, Aquatic Habitat (Fish), Livestock Grazing (Range),

Current and Future Timber Production, Logging Residue (Firewood), Water Quality and Quantity, Air Quality, Minerals, Energy, Individual Well-being, Local Economies, Old Growth, Roadless Lands, Economic Efficiency. The effects of the alternatives on these issues are addressed in Chapter IV.

While all of the issues have been considered during the alternative development and analysis, there are seven major issue areas which have evolved as having the most importance in the selection of the preferred alternative. These major issues are those which have caused the greatest amount of comment in public meetings held by the Forest (see Figure I-D-1), meetings with small groups and individuals, and correspondence received.

The seven most significant public issues are:

1. Dispersed Recreation
2. Old Growth
3. Roadless Lands
4. Scenic Quality
5. Timber Supply
6. Water
7. Wildlife, Fish, and Plant Habitat

The issue identification process is discussed in more detail in Appendix A.

Discussion Of Selected Issues

Most Forest management issues are interrelated. There is information about the issues throughout this document. As you read, look for the key symbols that are associated with each issue subject area. These key symbols identify the important issue related discussions which describe interrelationships with other resource issues, effects, and the resolution of conflicts. Effective resolution of the issues is a goal of the Forest Plan. The lack of compatibility among the resource uses at all levels of output affects the degree of resolution possible for any one issue since it is necessary to find an approach that is responsive to all issues. Therefore some tradeoffs are necessary in each of the issues.

Dispersed Recreation

Overview - The Forest provides a wide range of outdoor recreation opportunities. The Forest provides several developed recreation sites (campgrounds, ski areas, boat launch ramps, etc.), but the primary recreation emphasis for the Forest Service is to manage for dispersed opportunities. "Dispersed recreation" is a term used to encompass all the outdoor recreation activities that occur on the Forest outside of developed sites, such as sightseeing, hiking, fishing and hunting, backcountry camping, and cross-country skiing.

The alternatives analyzed in this FEIS have the potential to affect dispersed recreational settings more than developed sites. Greater public concern has been expressed by users, recreation interests, timber industry, and environmental groups about the effects of management on dispersed recreation than developed, although the total amount of recreational visits (nearly 3 million RVDs per year) to the Forest is about equally divided between the two categories.

The challenge for dispersed recreation is to provide a range of opportunities and areas desired by forest recreationists and at the same time provide for other Forest uses, and products demanded by other segments of the public. Many recreation users would like more dispersed areas, or at least an alternative

to Wilderness. Some would prefer low elevation areas near population centers suitable for year around use. Many who are associated with the timber industry, feel that dispersed recreation should not preclude timber harvest.

Most areas of the Forest supply diverse types of dispersed recreation experiences. A facet of this issue is that some dispersed activities conflict with each other and may be completely incompatible. This conflict is exemplified most clearly between dispersed nonmotorized/motorized uses, such as hikers/trail bikers, and cross country skiers/snowmobilers. Some recreationists would prefer to see snowmobiles and ORVs limited to designated areas apart from other types of use.

An aspect of the dispersed recreation issue that became more apparent from public comment between the DEIS and FEIS, was the role of rivers and river corridors in meeting recreation needs. One result of the increased interest in rivers was the designation of 2 Scenic and Recreation Rivers (upper McKenzie and NF of MF of the Willamette) and 2 Study Rivers (SF McKenzie and Blue River) in the Oregon Omnibus Wild and Scenic River Act of 1988. In addition to these rivers, the Little North Fork of the Santiam River is part of the State Scenic Waterways system. Public comments on the DEIS about the potential recreation and scenic values of other rivers on the Forest prompted a review of other rivers Forest-wide to determine which ones were eligible for Wild and Scenic River designation.

The scope of this issue also includes access and proximity of dispersed recreation opportunities to population centers and points of entry to the Forest. Many users associated with local hiking organizations desire more trails for hiking and other uses that are accessible at low elevation near population centers.

The responsiveness of the alternatives to this issue can be evaluated by considering the demand met and the number of acres that will provide semiprimitive nonmotorized and motorized opportunities. The number of Special Interest Areas provided and miles of trail constructed also indicate response to this issue.

Interrelationships with Other Major Issues

Old Growth: Many people enjoy recreational visits to old-growth forest for wildlife and plant viewing, camping, and solitude. Although large expanses of old growth inhibit some types of dispersed recreation, such as off-road vehicle (ORV) driving and horseback riding, these issues are generally compatible. There would be some interdependence in the amount of old growth retained in the different alternatives to the amount and type of dispersed recreation opportunities that the Forest would be able to provide.

Roadless Lands: The Forest's unroaded areas provide a destination for people who wish to participate in nonmotorized recreation activities outside of Wilderness. They may be closer to populated areas, and receive less visitation than the well-known Wilderness attractions. They offer opportunities for solitude and primitive experiences. Most of the roadless areas remaining on the Willamette are of a terrain and vegetation type that is difficult to access and unsuited for ORV use. Motorized recreation opportunities are limited or nonexistent in roadless lands.

Scenic Quality: The beautiful scenery of the Forest is one of the major recreation attractions. Driving for pleasure, which includes sightseeing, is one of the most popular activities on the Forest. Hiking, camping, and cross-country skiing are enhanced by pleasant visual experiences. In river corridors, scenic qualities of the rivers and adjacent forests are intergral to the recreation values.

Timber Supply: The roads that were constructed for the harvest of timber are now also the Forest access roads that facilitate dispersed recreation. Future timber harvesting could increase access for additional motorized recreation. Timber harvest has some potential to disrupt some recreation

opportunities. For instance, a timber sale may be planned that includes part of an existing trail system. The disruption is generally temporary, as funds are collected under the Knutson-Vandenberg Act for trail and trailhead restoration or replacement. Also, the noise and visual effects from logging operations are unpleasant to some hikers and campers.

Water: Many dispersed recreation activities are water oriented, so water quantity and quality are important to forest users. Maintaining reservoir water levels at historic levels is important to boaters. The supply of clean, cold water for fish habitat is of interest to people who enjoy fishing. There is the potential for very minor impacts on water quality in areas from dispersed recreation activities; two possible impacts might be from inadequate sanitation and erosion from overused trails. The water quality of rivers designated or eligible for Wild and Scenic Rivers is often one of the outstandingly remarkable values that contribute to the recreation experience.

Wildlife, Fish, and Plant Habitat: Dispersed recreationists use areas that are habitat for native species. These uses may have some impact on individual plant and animals living in those areas. There is likely to be little change in the overall habitat as a result of dispersed recreation activities, however, some recreation occurs because of the existence of the diverse Forest habitats, therefore a major change in habitats could affect some types of dispersed recreation. For example, a large reduction in forage and/or thermal cover for big game could reduce hunting opportunities. Logging old growth could disrupt bird watching.

Old Growth

Overview - There is general agreement among wildlife, recreation, and timber interests that some representation of stands of old-growth trees should be retained, but a wide disparity of opinion exists about how much is needed. Current allocations that provide for the preservation of old-growth timber stands include: Wilderness, Research Natural Areas, Old-Growth Timber Groves, and Undeveloped Roadless Recreation areas. Under the current plan, approximately 594,800 acres qualify as old-growth using the definition in the Pacific Northwest Regional Guide (R6 definition). Of this total, approximately 99,300 acres in the current plan are in allocations not subject to future harvest.

Old-growth timber stands are of special ecological concern because they represent a successional stage which provides unique habitat for certain species of plants and wildlife and because of their contribution to the forest gene pool. Some of the Forest's small animal species such as the red tree vole, flying squirrel, and spotted owl are completely or partially dependent on the old-growth canopy as part of their primary habitat. Plant species which have difficulty surviving in other than old-growth forest include certain saprophytes, such as candy-stick and pine-drops, and Oregon's small orchids, such as coral-root and fairy slipper.

Many people using the Forest for recreational purposes enjoy old-growth trees for their aesthetic and spiritual value. They consider old-growth trees as adding to scenic vistas, and providing cool shade, quiet, solitude, and a sense of history of the Forest. Old-growth stands are currently a significant component of both developed and dispersed outdoor recreation settings.

Conflicts arise because the existing old-growth stands contain large volumes of high quality timber which the forest industry in many cases would rather see made available for harvest. There are approximately 495,500 acres of old growth on suitable land which contain about 28 billion board feet of timber that could be available for harvest during the coming decades. Historically, the harvesting of mature Douglas-fir has been the backbone of the timber industry in the Pacific Northwest. Since there is still high demand for timber production from the Forest, the issue then becomes a question of how much old growth, which is not protected under preservation allocations such as Wilderness, should be

retained for recreational, aesthetic, spiritual, or habitat purposes and how much should be allocated for timber harvest.

Comments on the DEIS and activities during the development of the FEIS and Forest Plan indicate an intensification of public interest in the old growth issue. In addition to conflicts over the competing uses of this resource, comments on the DEIS also pointed to the lack of a consistent definition or agreement on what physical attributes of forest stands or criteria should be used to identify old growth. Since the DEIS there has also been increased attention to the specific physical characteristics of old growth and how these might be duplicated in managed stands. "New Forestry" or "New Perspectives in Forestry" are some of the terms that have recently evolved to describe a combination of silvicultural practices and harvest unit location considerations that are designed to maintain some of the ecological functions of old-growth stands throughout a timber rotation.

The responsiveness of the Alternatives to this issue can be evaluated by considering the acres of existing old growth retained on the Forest.

Interrelationships with Other Major Issues

Dispersed Recreation: Building additional roads as part of the harvesting of old-growth stands could increase access to different parts of the Forest, although leaving old-growth stands intact may provide destination points for people who participate in nonmotorized recreation. Stands of old growth provide scenic beauty to both motor and nonmotor recreationists. They provide solitude and quiet to those who walk into them.

Roadless Lands: The most extensive stands of old-growth timber that are outside of Wilderness are located in those parts of the Forest that have not been roaded for timber harvest. There is a strong correlation between these two issues and their resolution.

Scenic Quality: For many people, the appearance of the interrelationship of large trees, fallen trees, light and shadow, smaller plants and ground cover provide intrinsic scenic value. Stretches of old growth may also be attractive when viewed from a distance and add an appearance of texture to the overall scenic appearance of the Forest landscape. At some locations on the Forest, views of distant mountains and lakes may be obscured from travelways by stands of mature trees.

Timber Supply: The timber harvest program directly affects the amount of old growth which remains outside Wilderness and in other preservation type land allocations. With the demand to maintain or increase timber harvest levels, the demand to harvest old growth and to replace old-growth stands with faster growing second growth is likely to increase as well. Conversely, meeting the strong interest in retaining old growth for its scenic and wildlife values could lead to a reduction in allowable timber harvest. The issue of managing forest stands to retain certain structural components of old growth within managed forests, has introduced a potential means of addressing conflicts between timber supply and the ecological functions, and the wildlife habitat benefits of old growth. Values such as scenic quality, recreation and spiritual solitude would still be directly affected by New Perspectives Forestry, however.

Water: Old-growth stands provide high quality water due to the lack of disruptive activities and the filtering and stabilizing effects of the vegetative matter in the overstory and understory. Retaining old growth would have the effect of maintaining the status quo of water quantity (amount of runoff) and quality (no increase in sediment or water temperature) within the affected watershed. Harvesting old growth would have some short term potential for small amounts of change in the water draining from

the harvest area, though harvest impacts would be regulated in a manner to bring the water quality within limits allowed by Oregon Water Quality standards.

Wildlife, Fish, and Plant Habitat: Retaining the old growth will provide habitat for species dependent upon mature or older forest conditions. Old-growth areas contribute large material to streams and the forest floor which is unique to old-growth character forests. Old-growth areas also provide hiding and thermal cover for big game. "New Perspectives" or "New Forestry" concepts may also provide opportuntities to maintain critical habitat components of old-growth forests within a managed landscape.

Roadless Lands

Overview - Prior to the Oregon Wilderness Act of 1984, 294,775 acres of unroaded lands on the Forest were inventoried. As a result of that Act, 78,872 acres received Wilderness classification and 6,122 acres were included in the Oregon Cascades Recreation Area. There are now 380,805 acres of designated Wilderness within the Forest boundary, or roughly one-quarter of the National Forest System land on the Willamette. One area, the Mt. Hagan, 6,036 acres, qualified for further study as proposed Wilderness subsequent to the Oregon Wilderness Act of 1984. (See Chapter III, Section Q, Roadless Lands.)

The 209,845 acres remaining in an undeveloped condition were released to be planned for multiple use management, and the thrust of this issue is which of these areas should remain roadless. The issue surrounding roadless lands is focused on their use for amenity versus commodity values. Many members of the public, including recreationists, conservationists, and environmentalists prefer maintaining more undeveloped land for dispersed recreation use, wildlife habitats, preservation of natural ecosystems, and protection of soil mantles, water quality, and fisheries. Frequently, comments stressed that roadless lands are irreplaceable. Many people expressing concern for jobs, the area's economy, and the need for an adequate supply of wood products, also suggested that there is no need to preserve more roadless land, and that existing Wilderness should be better utilized.

Retaining the unroaded character of these areas provides options for semiprimitive nonmotorized recreation opportunities and possible future inclusion in the National Wilderness Preservation system. Future development options are not foreclosed by leaving these areas roadless during this planning period. Other benefits of maintaining the current character include preservation of the existing wildlife and plant habitat, opportunities for scientific research, and protection of cultural resources.

Allocating areas for roadless recreation limits the capability of these areas to produce some other benefits. Recreationists who rely on roads for access will not be served by these areas. Lack of immediate access hinders resource management activities and general administration as well as adding to the difficulty of controlling wildfires. This limitation may result in decreased economic returns from the Forest.

Road systems developed for timber management result in increased access to existing roadless areas, many of which are adjacent to Wilderness. Increased access could change visitor use patterns in Wilderness. The potential to view and hear timber management activities from the Wilderness could also increase, thereby reducing the quality of the overall Wilderness experience.

The responsiveness of the Alternatives to this issue can be evaluated by considering the acreage allocated to nondevelopment management areas.

Interrelationships with Other Major Issues

Dispersed Recreation: Retaining lands in an unroaded condition limits the ability of the Forest to provide some types of motorized recreation opportunities. Roadless areas provide primarily nonmotorized

recreation, and may decrease pressure for overuse in Wilderness by people looking for primitive experiences.

Old growth: Much of the acreage in the inventoried roadless areas is in an old-growth stand condition; therefore, retaining an undeveloped character in these lands would also preserve old-growth timber.

Scenic Quality: Retention of roadless lands would maintain some unbroken forest expanses which may be seen from overlooks and some distant travel corridors. It would also protect the scenic qualities of the existing vegetation type. There may be locations on the Forest where the development of an unroaded area may produce scenic vistas of mountains, lakes, rock formations, waterfalls, or other scenic attractions.

Timber Supply: If timber is held back from harvest, the pressure to cut in other areas of the Forest increases. Removing the timber in the inventoried roadless lands from the allowable harvest could reduce the potential for the Forest to meet local and national production needs and to support local economies.

Water: Retaining all current roadless areas in an unroaded condition would have little or no effect on water quality or quantity. Transpiration, run-off and sediment rates would remain the same if no development occurs. Development of the roadless areas may result in small amounts of change in water quantity; because of the implementation of protection measures directed by legislation and standards and guidelines, effects on water quality would be within the levels allowed by Oregon Water Quality standards.

Wildlife, Fish and Plant Habitat: Roadless areas provide wildlife habitat by having high snag levels, old-growth habitat, undisturbed riparian areas, and thermal cover. They provide potential sanctuary for sensitive or rare plant and animal species which are dependent on the natural undeveloped forest environment. Unroaded old-growth forest provides less forage for big-game animals than harvested areas, and provides little habitat for species that prefer vegetation in the early seral stages.

Scenic Quality

Overview - The scenic quality of the Forest has been identified as an important dimension of the use of the Forest by recreationists, travelers, and nearby residents. As more people are living near the Forest and visiting for recreational activities, public interest in and values expressed about the appearance of the Forest landscape has increased. Providing for other uses of the Forest, such as timber harvest and utility corridors, may affect the scenic quality of viewsheds which are visible from travelways, homesites, and recreation sites.

The high recreational values of the Forest are directly linked to its beautiful scenery. Resource management activities, including road construction and logging, can open up scenic vistas and routes to natural attractions.

Some segments of the public, and many who recreate in the Forest or are engaged in recreation related or dependent businesses prefer use of methods, throughout the Forest, to maintain scenic resources that are as natural as possible. Most who are concerned about scenic quality want impacts to the scenic resource minimized within road corridors and would like scenic resources maintained in areas of high recreational use. Many members of the public who could be affected by a declining harvest or are associated with the wood products industry feel that scenic quality should not be emphasized to the extent of great cost or the curtailment of timber production; management activities should not be

hidden from public view to meet aesthetic requirements; and that maintaining scenic values should not significantly reduce other resource ouputs or programs.

The responsiveness of the Alternatives to this issue can be evaluated by the acreage allocated to Visual Quality Objective prescriptions.

Interrelationships with Other Major Issues

Dispersed Recreation: Some dispersed recreation activities, (driving for pleasure, photography), are directly related to scenic quality, while others, like hunting, are less dependent on the visual appearance of the Forest. Hikers and campers are generally interested in visually pleasing surroundings. A major change in the observed landscape could change the focus or location of dispersed recreationists, but would not be expected to cause a decrease in Forest visitation.

Old Growth: For the people who prefer to view an unbroken forest canopy, seeing old growth is pleasant. Others may feel that it is dark and foreboding, or that it is blocking distant scenic vistas. Large, individual trees that are characteristic of old growth, are attractive and aesthetically pleasing in many forest settings such as along major travelways, trails and campgrounds. Generally, old growth adds to the overall beauty of the Forest landscape.

Roadless Lands: Access to some scenic attractions in unroaded areas may be restricted by the lack of roads. From scenic overlooks, roadless areas contribute to the appearance of the overall panorama of the Forest.

Timber Supply: Management for the production of wood products has the greatest potential for affecting scenic quality. The road construction and logging that are part of timber harvest change the appearance of the viewshed. In many cases, the most drastic changes of forested to nonforested land is short-term as regenerated stands restore a forested appearance with a few years. Other changes such as height of trees or texture of the canopy between young stands and old growth have longer term effects on visual appearance. Some people who are concerned about possible reductions in timber supply feel that visual concerns should receive less consideration than management for timber production.

Water: Viewing bodies of water as part of the recreational setting on the Forest adds to a pleasant visual experience. A serious degradation of water quality could decrease scenic quality. These two issues are generally compatible.

Wildlife, Fish, and Plant Habitat: There is little conflict between these two issues. Maintaining a variety of scenic landscapes could add to meeting the need for providing a diversity of habitats. The opportunity for viewing wildlife and plants adds to the scenic attraction of the Forest for recreation visitors.

Timber Supply

Overview - The amount of timber harvested each year from the Forest is important nationally as well as regionally. The average annual amount of timber sold, since 1977, has been 778 MMBF (all volume), while the amount harvested has been 672 MMBF. The Allowable Sale Quantity (ASQ) under the current plan (approved in 1977) is about 800 MMBF. This supply of timber supports approximately 16,500 primary and secondary jobs in the Upper Willamette Basin. Millions of dollars circulate through the Federal Treasury, several Oregon counties, and local businesses, that are directly related to Forest timber. Because of its economic significance, the continuation of the flow of this timber supply is of

high interest to the public. There is a detailed discussion of the economic contributions of, and demands for, timber harvest in Chapter III, Social and Economic Environment, and Timber.

Legislation passed by Congress mandates that forests capable of producing commercial timber do so. The amount produced from each forest, however, is determined by the capability of the forest itself. The amount of wood that can be offered for sale each year is based on the amount of land suitable for timber harvest, the amount of volume that the land is physically capable of producing, the other resource uses of the Forest and the intensity of timber management activities.

The instances in which timber harvest may have a perceived negative effect on other resources cause this management activity to be a public issue. The major focus of this issue is the level of timber harvest to be provided during the plan period and in later decades. At the core of the issue is the conflict between harvest levels and the preservation of old-growth timber stands, roadless areas, and wildlife habitats and the maintenance of scenic quality.

Many members of the timber industry feel that measures should be taken to increase timber production and minimize the emphasis on other resources. Some members of this group feel that management of timber resources should be the primary use of the Forest. Many members of conservation and environmental groups believe that there is too much timber harvesting, especially of old-growth timber. They feel that much of the old growth should be preserved, even to the point of encouraging builders to seek alternatives to wood for building materials. Many recreation and Wilderness advocates believe that roadless lands should be maintained in their undeveloped condition as they are irreplaceable. Most wildlife interest groups feel that heavy timber harvest will be harmful to some wildlife, particularly old-growth dependent species such as the spotted owl. Many recreationists would like areas within travel corridors and around recreation sites and areas to remain natural appearing and prefer that the visible effects of timber harvest should be minimized.

Current inventory data and accurately modeling the production capabilities of the Forest are key aspects of the timber supply issue emphasized in public comments on the DEIS. Since laws and regulations concerning Forest Plans are explicit about how allowable harvest levels and the resulting timber supply are determined, there is a high level of concern that the best available information on inventory and production capabilities be used.

The responsiveness of the Alternatives to this issue can be evaluated by considering the Allowable Sale Quantity (net), the Timber Sale Program Quantity (gross), and the number of cords of firewood provided.

Interrelationships with Other Major Issues

Dispersed Recreation: Timber management can be compatible with motorized dispersed recreation, because roads are constructed and maintained to support harvest activities, increasing access to different areas on the Forest. It may be considered in conflict with nonmotorized recreation by some Forest users because of noise, increased traffic occurrence, and a reduction in specific types of recreation opportunities.

Old Growth: Large old-growth Douglas-fir has been a major component of the timber supply from the Forest. Many local mills are tooled for manufacturing wood products from this type of timber. The remaining old-growth forests could contribute a significant quantity toward the Forest's harvest. Harvesting the old growth would reduce habitat for several wildlife and plant species, and reduce some scenic and recreation values associated with that plant community type.

Roadless Lands: Roads constructed in unroaded areas to access timber for harvest and administration purposes would change the roadless character. Timber harvested by aerial logging methods will alter the appearance of the unroaded area. Both of these activities would reduce the potential for future Wilderness designation. Leaving the roadless lands out of the landbase of the allowable timber harvest could reduce the amount of timber supplied from the Forest for wood products.

Scenic Quality: The scenic character of the Forest landscape is changed by road construction and timber harvest. Access to scenic views may be created through harvest activities. Harvest units may be evident from travel corridors, overlook points, and areas of recreational use.

Water: Water quality and quantity can be greatly affected by resource development activities. Consequently, timber harvesting is carried out under regulations, and standards and guidelines for protection. The alternative management strategies considered in this FEIS all provide at least the minimum legally required protection. There may be some variation in water yield and quality related to the amount of timber harvest allowed.

Wildlife, Fish, and Plant Habitat: Big game forage habitat can be improved through the creation of openings in closed stands of timber. The removal of extensive areas of the Forest canopy can reduce thermal cover which big-game animals need for protection. The vegetation manipulation which occurs during timber harvest changes the character of the habitat environment for different species of animals and plants. Habitat quantity and quality may be increased for some species, and decreased for others. Under the Knutson-Vandenberg Act, funds collected from timber sales may be used for projects to improve fish and wildlife habitat.

Water

Overview - The purity and abundance of the water which flows through the Forest is important to other forest resources, to the people who reside in Oregon, and to those who visit the Forest. The water is used for domestic water supplies, irrigation, fishery habitat and fish hatcheries, power generation, and a wide variety of recreation activities. The issue of water quality is primarily focused on long-term effects of suspended sediments (turbidity) and temperature of fisheries habitats resulting mainly from the rate and distribution of timber harvest activities and road construction. Some public attention has also been directed at the possible introduction of chemicals and bacterial contamination into Forest waters. Some domestic water-supply users and many fish and wildlife habitat interests believe that harvest activities adjacent to lakes, rivers, and streams may have adverse effects on water quality. Some from these interest groups feel that new road and trail access to lakes should be prohibited. Many timber industry members feel that current standards governing harvest in riparian zones are adequate for protection of water quality and riparian habitats. They also feel that additional constraints will increase costs, reduce harvest volumes, and ultimately reduce employment levels. Some members of the general public would like to see an end to the use of chemicals to enhance tree growth and control competing vegetation because of potential health hazards, from the risk of contaminating Forest lakes, rivers, and streams. Others feel that the use of chemicals is essential in maintaining annual harvest volumes.

The responsiveness of the Alternatives to this issue can be evaluated by considering the "Adverse Watershed Impact" Ratings and amount of erosion.

Interrelationships with Other Major Issues

Dispersed Recreation: Some dispersed recreation activities may adversely affect water: overuse of trails next to streams could increase sediment in the streams; increased hiking by people and dogs

increases the possibility of the spread of bacterial contaminants such as *giardia lamblia*; overuse of off-road vehicles can cause soil loss and erosion. Water supports many types of dispersed recreation, such as fishing and boating, and adds to the enjoyment of others, such as camping and sightseeing.

Old Growth: The abundant rainfall in the Cascades is a major factor in the existence of large old-growth Douglas-fir and Western red cedar trees. Old-growth stands provide high quality water by preventing erosion and providing thermal cover for temperature stability.

Roadless Lands: These two issues are compatible; the existence of unroaded areas has no adverse effect on the water resource.

Scenic Quality: Water is a major component of the Forest's scenery. The lush vegetation is due to the amount of precipitation. Water features such as rivers and lakes are viewed by most people as positive visual experiences. Management activities designed to enhance scenic quality would generally also be compatible with watershed protection.

Timber Supply: Harvesting trees and the road-building that may accompany logging operations are the resource management activities that have the greatest potential for impacting water quality. There may be a greater amount of water runoff from lands where large vegetation has been removed, as well as increases in sedimentation and water temperature.

Wildlife, Fish, and Plant Habitat: Protection of the water quality and quantity is vital to the protection of habitats for native and desireable nonnative species. The water conditions of the Forest contribute to the diversity and richness of wildlife and plant habitats. The standards which are followed to measure water quality and quantity are designed to avoid adversely affecting aquatic species.

Wildlife, Fish, and Plant Habitat

Overview - The Forest is home to a diverse array of wildlife, fish, and plant species and provides reproductive habitat for over 170 avian breeding species, 64 mammalian species, 30 amphibian and reptilian species and numerous sensitive plant species. Depending on the amount and condition of available habitats, species populations will fluctuate over time. The relationship of these species to their habitat is complex and not every detail is completely known or thoroughly understood. However, biologists do know that the success of a species to inhabit a given environment is dependent on several factors to meet basic survival and reproductive requirements. One such significant factor is the amount extent, condition, and quality of species supporting habitat.

The wildlife, fish, and plants issue is centered on the conflict between timber harvest and providing sufficient habitat, with the desired attributes of extent, condition, and quality, to ensure sustained viable populations of native species.

Most who favor protection of wildlife, fish, and plant habitats believe that timber harvest levels are too high to sustain current habitats for a diverse range of species. Many members of these wildlife interest groups feel that diverse habitats should be provided but that species emphasis should be placed on preservation of habitats of old-growth dependent species. Some from these interest groups also feel that timber harvest is important for big-game species but that connected and undisturbed corridors should be left for old-growth dependent species.

Many members of the public associated with the timber industry feel that Wilderness and other "set-aside" areas provide adequate habitat for old-growth dependent species, such as the spotted owl. They feel that wildlife habitats are enhanced by timber harvest and that sustained yield timber management

will provide habitat adequate to meet wildlife needs. Many others associated with the timber industry feel that timber harvesting is a vital part of the multiple use concept and it should not be excluded to provide for wildlife, fish, and plant habitats and that over-dedication for nonharvest uses could lead to an economic decline.

The responsiveness of the Alternatives to this issue can be evaluated by considering the habitat provided for certain indicator species.

Interrelationships with Other Major Issues

Dispersed Recreation: One of the major components of dispersed recreation is related to enjoyment of fish and wildlife and plants. Many outdoor recreation trips include photography, viewing, fishing, and hunting. Forest visitors may adversely affect some native and desireable nonnative populations by picking rare plants, disturbing nesting sites, or poaching. Managing to provide diverse habitats will generally enhance dispersed recreation opportunities.

Old Growth: This mature forest type provides habitat for many small species of birds and animals and plants that do not thrive in other habitats. It also provides thermal cover for protection of big-game animals. Riparian areas associated with old growth provide high quality habitat for native species; large, stable logs down in streams form pools where fish can live and hide. These two issues are strongly interrelated and are compatible.

Roadless Lands: The remaining unroaded areas on the Forest add to the diversity of habitats of the current condition. They support populations which are dependent on old growth and provide hiding cover for big game.

Scenic Quality: The diversity of habitats on the Forest is part of the varied landscape which gives the Forest much of its visual appeal--from the low elevation old growth, to lush meadows, to the alpine regions.

Timber Supply: Total populations of big game have increased since the last century, as timber harvest has created openings for forage for elk and deer. However these animals also need thermal cover, which exists under a closed forest canopy. Since previous harvest activity has reduced the amount of old-growth forests on the Forest, managing to maintain viable populations of all wildlife, fish, and plant species may cause a reduction in the available timber supply in the future.

Water: The amount of clean, clear water available is a critical part of the range of habitats that exist on the Forest. Abundant rainfall and an extensive stream system support many species of plants and fish. Protection of this resource is as important to the native species as it is to the people who now inhabit the region.